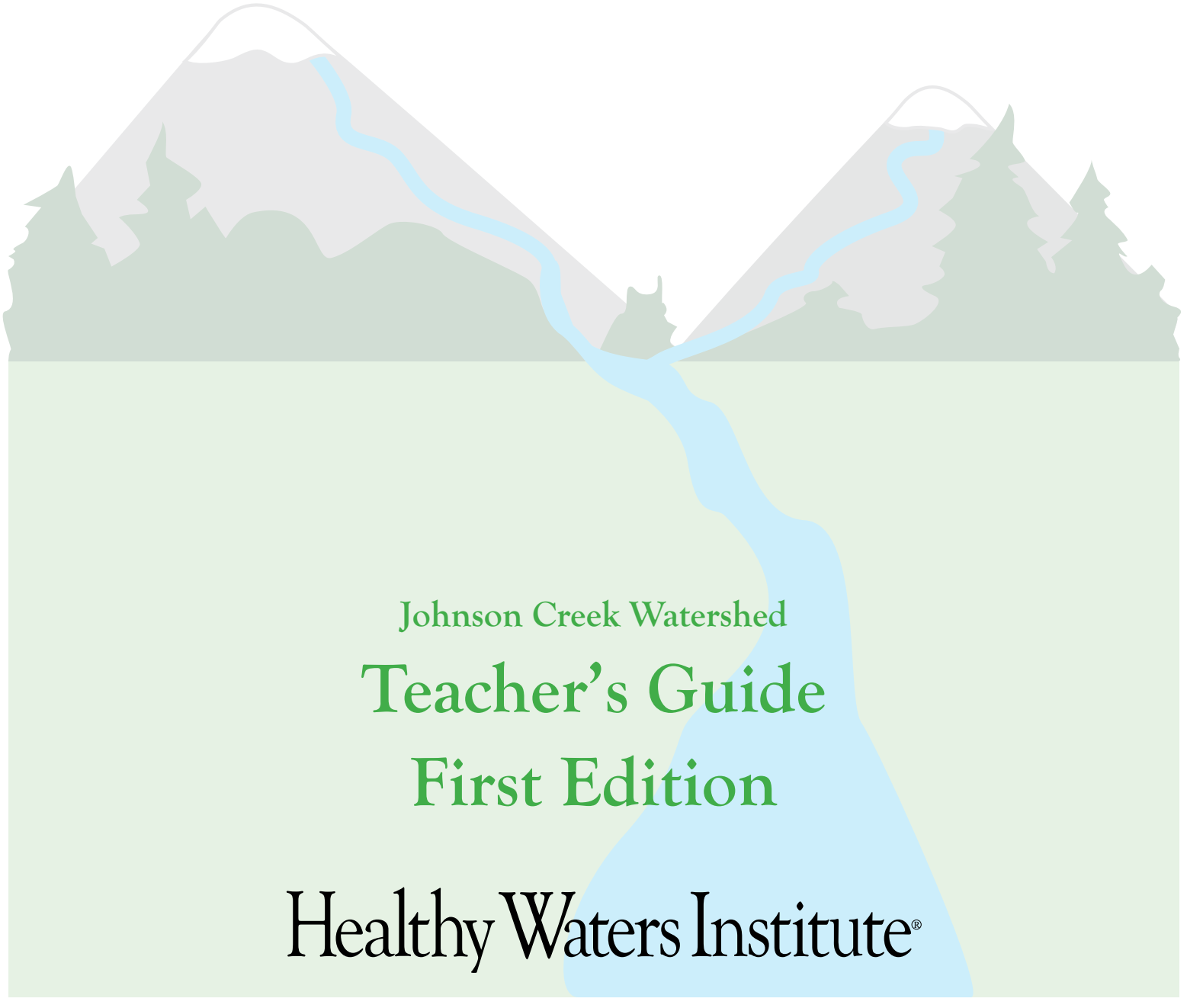
Hometown Waters



Johnson Creek Watershed

Teacher's Guide

First Edition

Healthy Waters Institute®

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Introduction to Hometown Waters

Middle/High School Watershed Education Program of the *Healthy Waters Institute*® (*HWI*)

"A watershed is that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

— John Wesley Powell

RATIONALE

Despite Oregon's reputation as a progressive state with a history of strong environmental leadership, the long-term prognosis for our freshwater ecosystems is grave. A recent national sampling shows Oregon's freshwater systems to be less supportive of aquatic life, less able to provide fish safe for human consumption, and more chemically unsafe to swim as compared to the national average. Though there are many local, state, and federal agencies and organizations currently working on-the-ground to improve the health of our home waters, restoration without stewardship is futile. Current efforts can be undone in a single generation if our youth do not understand the value of healthy rivers and streams.

Streams and rivers work like veins and arteries. The health of the water they carry is dependent on the health of the ecosystems and regions through which they flow. Healthy water is an indicator of a healthy watershed. In order to permanently achieve healthy waters in Oregon, we must take meaningful steps today to engage students statewide in the long-term stewardship of our watersheds. By forging a connection between students and their local watersheds through authentic educational experiences, rooted in relevant, experiential and place-based learning, *HWI* seeks to improve watershed health statewide by engaging students in region-specific field experiences and stewardship projects that benefit their home waters.

We all live in a watershed and it is therefore vital that we work together to reach all students in all areas, regardless of their geographic, ecologic, economic and demographic differences. Through the strength of partnerships, *HWI* seeks to build community interest in and support for conservation by bringing together a diverse group of volunteers, teachers, school administrators, students and local partners to educate the next generation of watershed stewards.

GUIDING PRINCIPLES

HWI relies on a set of assumptions to guide our efforts in working to ensure the future health of Oregon's rivers and streams. These guiding principles are considered throughout *HWI* program development and in support and implementation of partner programs and activities.

1. Water is our most valuable resource.
2. Students are future stewards of watershed health.
3. Authentic educational experiences, rooted in relevant, experiential and place-based learning, holistically prepare and empower our students in becoming future stewards.
4. Supporting increased connections between schools and communities will result in a young citizenry better equipped to understand and address community issues in informed and innovative ways, contributing to Oregon's overall livability.

WATERSHED EDUCATION

HWI develops, delivers and brings together watershed education programs, activities and partners that will help move youth from students to stewards. *HWI* considers the following local watershed concepts essential in preparing students for watershed stewardship:

1. Outdoor Ethics
2. Climate
3. Geography
4. Geology
5. Vegetation
6. Fish
7. Wildlife
8. History
9. Demographics
10. Water
11. Economy
12. Ecology
13. Eco-Art
14. Local partners

HWI works with schools, teachers and local partners to maximize student experience with the following concepts as they relate to local watershed education:

Outdoor Ethics – Interaction with the natural world:
- Responsibility for stewardship or care of the land
- Respect for the land and all its resources at all times and on all occasions
- Consideration of impact on the environment

Climate – Long-term weather pattern of the local watershed, including:
- Temperature
- Precipitation
- Wind

Geography – Study of the local watershed and its features, inhabitants and phenomena:
- Physical – processes and patterns in the natural environment
- Human – processes and patterns of human interactions shaping the local environment
- Environmental – spatial aspects of interactions between humans and the natural world
- Techniques – including mapping and GIS

Geology – Study and science of solid matter in the local watershed including:
- Rocks
- Soil
- Processes that shape the matter

Vegetation – Plant life of local watershed:
- Upland Forests
- Riparian
- Grasslands

Fish – With regard to the study of local:
- Native Species
- Non-Native Species
- Hatcheries, barriers to migration, other local issues

Wildlife – With regard to the study of local:
- Native Species
- Non-Native Species
- Habitat locations, endangered species, other local issues

History – With regard to the study of local:
- Native Inhabitants
- Settlement of watershed

Demographics – Population characteristics of local watershed

Water – With regard to the study of local:
- Watershed zoning
- Domestic water supplies
- Water treatment
- Regional hydrology
- Water use

Economy – The role of water in local economy with regard to:
- Products
- Services
- Agriculture

Ecology – The interaction among organisms and between organisms and their environment

Eco-Art – Study of the aesthetics of local watershed characteristics through:
- Streamside sketching
- Journal making
- Creative writing
- Photography
- Painting

Local Partners – It is essential for students to identify and get to know community partners in order to learn from them and get involved in local projects

PURPOSE

Hometown Waters (HW) was designed to help students move from home and school grounds out into the larger watershed unit. HW provides an interdisciplinary approach to watershed education, and opportunity to discover all aspects related to home watersheds through the inquiry process.

HW works to create a watershed-as-home concept by placing students in a web of awareness that will help them understand how water moves through their watershed, how the actions of the citizens of the watershed affect the water, and how each student's life is touched by the water as it moves through their watershed.

The success of HW in connecting students to their local watersheds is dependent on local resources including experts, community partners and existing educational materials. Each community holds the key to unlocking and connecting students with the local watershed. This program is not about *HWI* curriculum. It's about connecting the right people and the right opportunities to help our students develop a greater understanding of and connection to the watershed in which they live. In order for students to truly develop a sense of place, communities need to come together to collectively offer resources and to support teachers in integrating meaningful watershed activities into school curriculum.

HWI's role in HW is to share resources and successes between partners, teachers, schools and students. From its inception, *HWI* has been a collaborative effort, and is reliant on strong partnerships with schools, watershed councils, state and federal agencies, local governments, landowners, citizens, soil and water conservation districts, conservation groups, and others. *HWI* Regional Education Coordinators, Assistants and staff work to enhance delivery of water education and ensure that stewardship projects undertaken by classrooms are meaningful to the community.

Acting as a connector and catalyst, *HWI* seeks to strengthen existing partnerships and form new connections between entities seeking to engage students in hands-on watershed education. By uniting education, community, and stewardship, *HWI* takes an active role in cultivating the next generation of watershed stewards.

OBJECTIVES

The goal of HW is for students to develop a greater awareness and deeper understanding of their local watershed. The objectives are based on watershed features as integral components in fostering a watershed-as-home concept.

Students participating in HW should be able to:

1. Name the watershed (and sub-basin if appropriate) in which they reside.
2. Identify the headwaters and mouth of their home watershed.
3. List major factors influencing the nature of the water in their watershed.
4. Describe the eco-regions and/or primary plant associations in their watershed.
5. Describe personal water use and where that water ultimately comes from and goes within their watershed system.
6. Describe the historical condition of their watershed (pre-European influence) and name ways the watershed has changed over time.
7. Identify wild and domestic creatures that live in their watershed.
8. Name the most important crops, products, and/or services produced in their watershed and describe how water is essential for the economy.
9. Become familiar with organizations involved in restoration, conservation, and/or management of their watershed and know how they can personally get involved to make a difference.

HW TOOLKIT

The following tools are the building blocks of HW:

1. Virtual Watershed Tour
2. Regional Watershed Information

3. Watershed Inventory
4. Programs & Activities
5. WebQuest
6. Service Learning/Extended Application
7. Community Sharing

Stringing these tools together as a packaged program offers students repeat opportunities to learn about their watershed through a variety of disciplines and formats. The progression of these tools takes students from a basic level introduction to their local watershed through in-depth examinations of aspects that both pique their curiosity and satisfy classroom goals. Built-in to this package is flexibility in timing, topic and delivery, much of which will be determined by students, teachers and available local resources. We strongly encourage all teachers and partners to share their use of these tools and activities with *HWI*. *HWI* will continue to share materials through our website. We hope to see the collection of adapted and added ideas continue to grow and serve as inspiration for others in connecting students with their home waters.

SUPPORT FROM HWI

HWI will assist schools incorporating watershed education by offering:

- Educational materials
- Teacher grants – up to $500
- Student grants – $200 maximum for high school students
- Travel and substitute teacher reimbursement
- Networking opportunities with diverse community partners
- Student scholarships – four $1500 awards for juniors and seniors
- Publications – healthy waters kids and journal
- Website – resources, opportunity for students to share projects
- Assistance in developing student summits
- Trainings, workshops and consultation

Healthy Waters Institute®

2008/09 TEACHER GRANT APPLICATION

Oregon Trout

The Healthy Waters Institute (HWI) seeks to connect every student with their home waters. Through meaningful outdoor educational experiences and commitment to local communities, we will cultivate citizens capable of maintaining the health of waters statewide. HWI is a provider of tools, programs and services that help teachers and students connect with their local waters through community-based projects.

HWI offers grants to help teachers engage students with their home waters. Grants up to $500 may be used to pay for field trip transportation costs, substitutes, equipment, rentals, or other relevant science education tools and/or services. HWI encourages teachers to submit grant requests following the guidelines below. One role of the local HWI Regional Education Coordinator is to assist teachers in the grant application process; HWI encourages teachers to contact their local REC for more information and for assistance in creating a project that helps connect students with their home waters.

PILOT RESOURCE POOL GRANTS

Submissions:
- Individual grants up to $500
- Teachers may submit more than one request
- Open ended submission period

To Be Used For:
- Transportation
- Substitutes
- Equipment
- Rentals
- Other science education tools and services

Who Can Apply:
- Teachers within the pilot watersheds
- Salmon Watch teachers
- Other teachers with projects that further the HWI mission.

How To Apply:
- Submit the completed Grant Application Form to your Regional Education Coordinator for consideration (see sidebar).

Additional Requirement:
- Successful applicants are required to submit a final report (with photos) for use on-line or in HWI journal

Traci Price
Director, Healthy Waters Institute
Oregon Trout
65 SW Yamhill St. Suite 300
Portland, OR 97204
503.222.9091 x 25
traci@ortrout.org
www.healthywatersinstitute.org

Information about other HWI watersheds:

Kim Carson
Regional Education Coordinator – *Mid-Willamette*
Oregon Trout
230 S 3rd St, Suite 202
Corvallis OR 97333
541.753.4280
kim@ortrout.org

Sarah Oakley
Regional Education Coordinator – *Portland Metro*
Oregon Trout
65 SW Yamhill St. Suite 300
Portland, OR 97204
503.222.9091 x 20
sarah@ortrout.org

Kolleen Yake
Regional Education Coordinator – *Central Oregon*
Oregon Trout/Upper Deschutes
Watershed Council
700 NW Hill Street
Bend OR 97709
541.382.6103 x 33
kolleen@ortrout.org

Healthy Waters Institute®

2008/09 TEACHER GRANT APPLICATION

Oregon Trout

Date _____ Phone _____

School _____ Fax _____

Address _____ Name _____

_____

_____ Email _____

Watershed:

☐ Johnson Creek ☐ Marys River ☐ Upper Deschutes ☐ Other _____

List names of teachers/ leaders who will participate in project: _____

_____

_____

YOU MAY ATTACH A SECOND SHEET FOR MORE SPACE TO ANSWER THE FOLLOWING QUESTIONS.

Project Description (maximum 250 words):

Explain, by dollar amount and item, how grant funds will be spent?

Who/how many will benefit from the grant?

How does the project fit into the overall goals of HWI? (maximum 250 words)

If the project is on-going, how will it be funded in the future?

List other sources of funding for the project:

If you are mailing this form, please send it to your Regional Education Coordinator (contact information on previous page) or to our main office:

HEALTHY WATERS INSTITUTE
65 SW YAMHILL, SUITE 300
PORTLAND, OREGON 97204
(503) 222-9091 x20 Fax (503) 222-9187

Healthy Waters Institute®

2008/09 STUDENT GRANT APPLICATION

Oregon Trout

The Healthy Waters Institute (HWI) seeks to forge a lifelong, caretaking bond between students and their local watersheds ensuring the health of Oregon's rivers and streams for generations.
Students across Oregon are participating in valuable stewardship and research projects that benefit their home communities and the health of their local watersheds. HWI is committed to supporting and promoting the efforts of engaged students recognizing their role as citizens, equipped to understand and address community issues in informed and innovative ways.

HWI offers grants to help students participate in watershed projects. Grants up to $200 may be used to pay for transportation, equipment, rentals or other relevant tools and/or services. All Oregon high school students are eligible. Grants will be awarded to students who propose projects benefiting the health of an Oregon watershed. Projects include but are not limited to research, monitoring, creative arts, and public awareness. Projects do not have to be directly affiliated with an HWI program or staff member.

STUDENT GRANTS

Submissions:

- Individual grants up to $200
- Students may submit more than one request
- Submissions accepted on a rolling basis

To Be Used For:

- Transportation
- Equipment
- Rentals
- Other project tools and services

Who Can Apply:

- All Oregon high school students

How To Apply:

- Submit the completed Grant application form and signed letter of support from a teacher on-line (www.healthywatersinstitute.org), to a Regional Education Coordinator (if applicable) or by mail.

Additional Requirement:

- Successful applicants are required to submit a final report with documentation (photos, video, newspaper articles, original or images of products created) for use on-line or in HWI publications.

Traci Price
Director, Healthy Waters Institute
Oregon Trout
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Watershed Council
700 NW Hill Street
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kolleen@ortrout.org

Healthy Waters Institute®

2008/09 STUDENT GRANT APPLICATION

Oregon Trout

Date _____ Phone _____

School _____ Fax _____

Address _____ Name _____

_____

_____ Email _____

Watershed:

☐ Johnson Creek ☐ Marys River ☐ Upper Deschutes ☐ Other _____

List names of supporting teachers. You MUST include a signed letter of support from at least one teacher.

_____

_____

YOU MAY ATTACH A SECOND SHEET FOR MORE SPACE TO ANSWER THE FOLLOWING QUESTIONS.

Project Description (type of project, timeline, location). _____

_____

_____

_____

Impact—how will the project be shared with the watershed or community? _____

_____

_____

_____

Personal Statement—how does this project relate to personal/career goals? _____

_____

_____

_____

Budget—how will the grant be used? _____

_____

_____

_____

List other partners and organizations invovled in your project.

_____

_____

_____

REMEMBER: Successful applicants are required to submit a final report with documentation (photos, video, newspaper articles, original or images of products created) for use on-line or in HWI publications.

If you are mailing this form, please send it to your Regional Education Coordinator (contact information on previous page) or to our main office:

HEALTHY WATERS INSTITUTE
65 SW YAMHILL, SUITE 300
PORTLAND, OREGON 97204
(503) 222-9091 x20 Fax (503) 222-9187

Getting Started

1. LOCAL PARTNERS

The first step in connecting students to their home waters is finding out who in your community can provide and support watershed education in and out of the classroom. Contact a *HWI* Regional Education Coordinator or get in touch with your local Watershed Council, Soil & Water Conservation District or Natural Resource agency or organization. Talk with other teachers in your school – find out what local groups they are working with. See the chart on the next page for some ideas.

2. RECOMMENDED RESOURCES

In the event that local watershed educational programs and partners are scarce, we recommend keeping the following guides on hand:

- The Streamkeeper's Field Guide: Watershed Inventory and Stream Monitoring Methods, Adopt-A-Stream Foundation (http://www.streamkeeper.org/catalog/books.htm)
- The Stream Scene: Watersheds, Wildlife and People, Oregon Department of Fish & Wildlife (http://www.oregon.gov/OPSW/archives/streamscene/StreamScene.pdf)
- Project WET Curriculum and Activity Guide, Project WET (http://www.projectwet.org/wetguide.htm)
- The Ecology Field Guide, Wolftree, Inc. (http://www.beoutside.org/)
- Create you own "Regional Reading" list – find non-fiction, fiction, essays, natural history, myths, legends, and poetry about your watershed region. Build a regional library for your classroom.

3. HW TOOLKIT

Collect and develop tools to teach your students about their local watershed. You can find some of these through *HWI*. If *HWI* does not have tools for your specific watershed, you will be able to find templates of each tool which you can adapt to incorporate regionally specific information for your watershed. Adapting tools can be a great student project! The local partners you've identified probably have the information you need. We encourage you to share new materials with *HWI* so they can be made available to a larger network of partners.

4. PLAN AHEAD

- Invite local experts and *HWI* staff to share information with your class
- Talk about a Service Learning or Independent Project with your students – what kind of watershed project are they interested in?
- Make nature journals with your students to be used for observing outside, drawing, homework assignments and writing down thoughts, ideas and inspirations! (The use of recycled and/or natural materials is strongly encouraged!)

WATERSHED INFORMATION

Adapted from The Streamkeeper's Field Guide

	Source	Outdoor Ethics	Climate	Geography	Geology	Vegetation	Fish	Wildlife	History	Demographics	Water	Economy	Ecology
Colleges & Universities	Departments of: Biology, Botany, Ecology, Entomology, Environmental Studies, Fisheries, Geology, Natural Resources, Wildlife, Zoology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Local Agencies	Libraries/Internet: City, County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Cities: Departments of Public Works, Public Health, Planning			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Counties: Departments of Public Works, Planning, Public Health, Government Councils, County Extensions, Conservation Districts, River Basin Teams		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Indian Tribes: Fish & Wildlife Departments, Tribal Councils	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Regional	Watershed Councils, Soil & Water Conservation Districts, River Conservation Groups, Water Districts			✓	✓	✓	✓	✓	✓		✓	✓	✓
State Agencies	Department of Fish & Wildlife					✓	✓	✓	✓		✓		✓
	Department of Forestry					✓		✓	✓				✓
	Department of Environmental Quality		✓			✓	✓	✓			✓		✓
	Department of Natural Resources, Lands, etc.				✓	✓	✓	✓	✓	✓	✓		✓
	Department of Ecology			✓	✓	✓	✓	✓	✓		✓		✓
	Department of Social and Health Services						✓		✓	✓	✓	✓	
Federal Agencies	Bureau of Land Management			✓		✓		✓					
	Forest Service					✓	✓	✓	✓				✓
	Environmental Protection Agency					✓		✓			✓		✓
	Fish & Wildlife Service						✓	✓	✓		✓		✓
	Army Corps of Engineers					✓	✓	✓	✓		✓		
	National Resource Conservation Service			✓	✓	✓	✓	✓		✓	✓		✓
	Soil Conservation Service				✓	✓	✓	✓		✓			✓
	National Marine Fisheries		✓				✓	✓	✓		✓		✓
	Geological Survey				✓	✓			✓				
	National Weather Service		✓										

Virtual Watershed Tour

VIRTUAL WATERSHED TOUR

A virtual tour is a general education tool used to introduce students and the general public to their home watershed. Students can research, compile and create their own virtual watershed tour for their area, the process for creating the tour gives students and opportunity to unearth a wealth of watershed information, history, photos and data with which to create a visual and informative tour of their home watershed. This tool offers a glimpse into watershed imagery and the opportunity to communicate information about the geography, hydrology, ecology, history, and community land and water use issues in your watershed. Powerpoint presentations are the ideal format rich with images as opposed to text. Tours should be approximately 35-45 minutes in length.

Options for content include:

1. Tracing the watershed path from headwaters to mouth.
2. Focusing on watershed features: geology, hydrology, historical land use, current land use, exceptional or interesting features—(i.e. petroglyphs, spouting horns, waterfalls)
3. Providing a comprehensive overview of the featured watershed. Names of watershed, major tributaries, counties, and other locators should be used.
4. Covering local land use as a major factor in watershed health in more depth than geology or basic hydrology. Land uses and impacts often reveal patterns - the upper reaches may be impacted by forestry, followed by agricultural impacts slightly lower in the system, with urban development and impacts from industry in the valley floors.
5. Imparting a strong "what you can do" or "what's being done by people who care" theme to give viewers a sense of actions they can take to improve their watershed.

Virtual Watershed Tours can be created through a variety of means. Photos and information can be collected and compiled from local archives and partners; digital cameras can capture what you want to present. Putting together a tour is a great student project!

Regional Watershed Information

REGIONAL WATERSHED INFORMATION

Regional Watershed Information should be integrated into all activities. Creating a document to keep it all in one place is an effective tool to use as a reference for teaching to a variety of concepts.

Regional information should include:

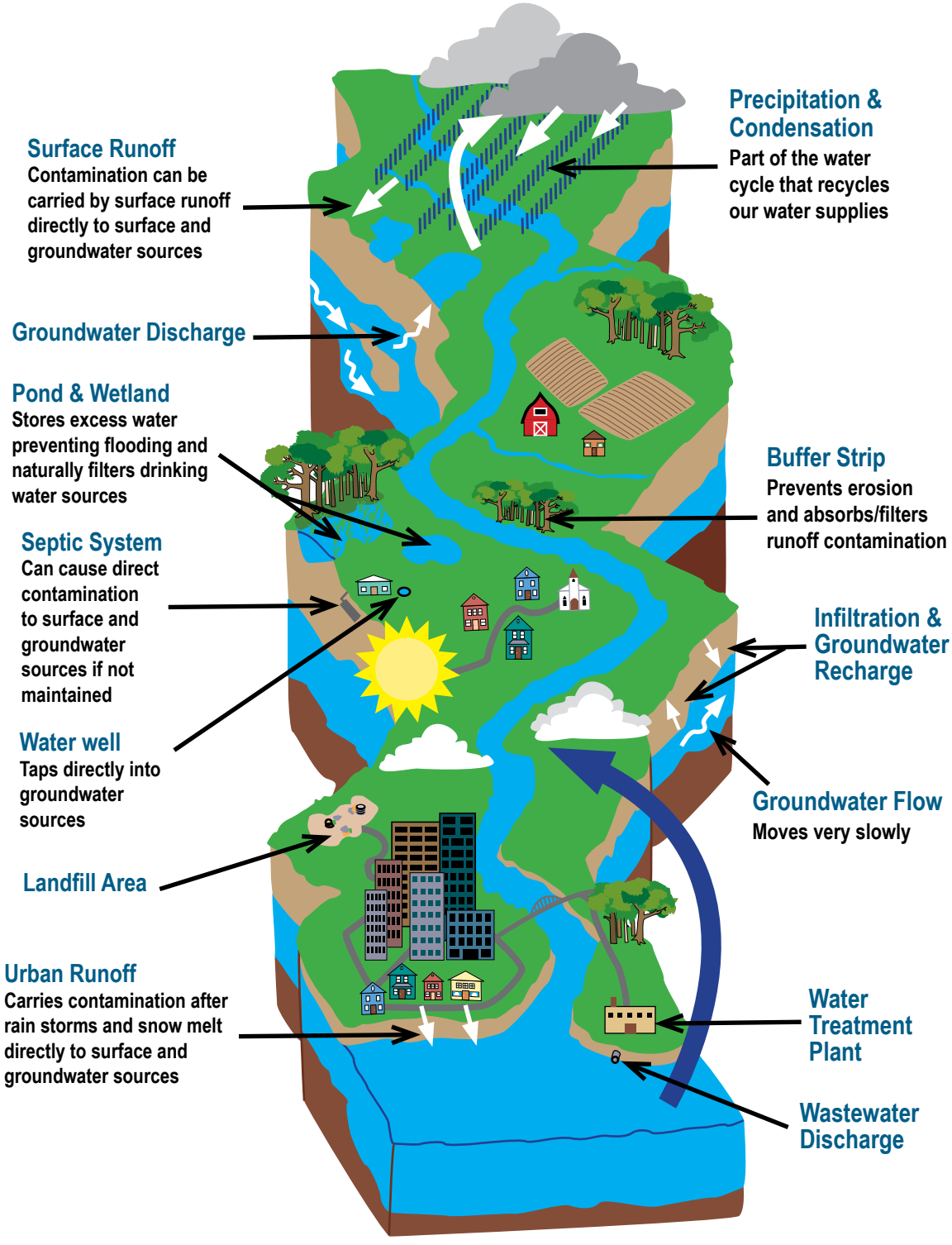
1. Watershed boundaries
2. Headwaters: a written description of the headwaters should include basic hydrology, land use/management, and recharge.
3. Primary watershed issues of concern.
4. Eco-region and/or plant association group maps.
5. History: 1-2 pages describing settlement, European settlement, land use patterns (specifically natural resource extraction activities), historic vegetation, water management (including significant dam implementation and other channel modifications), and the history of regional native fish declines.
6. Wildlife (ODFW wildlife habitat maps might work well for this).
7. Economy: ½ page overview.

Regional information can be compiled through a variety of resources. Students are also a great resource for this project!

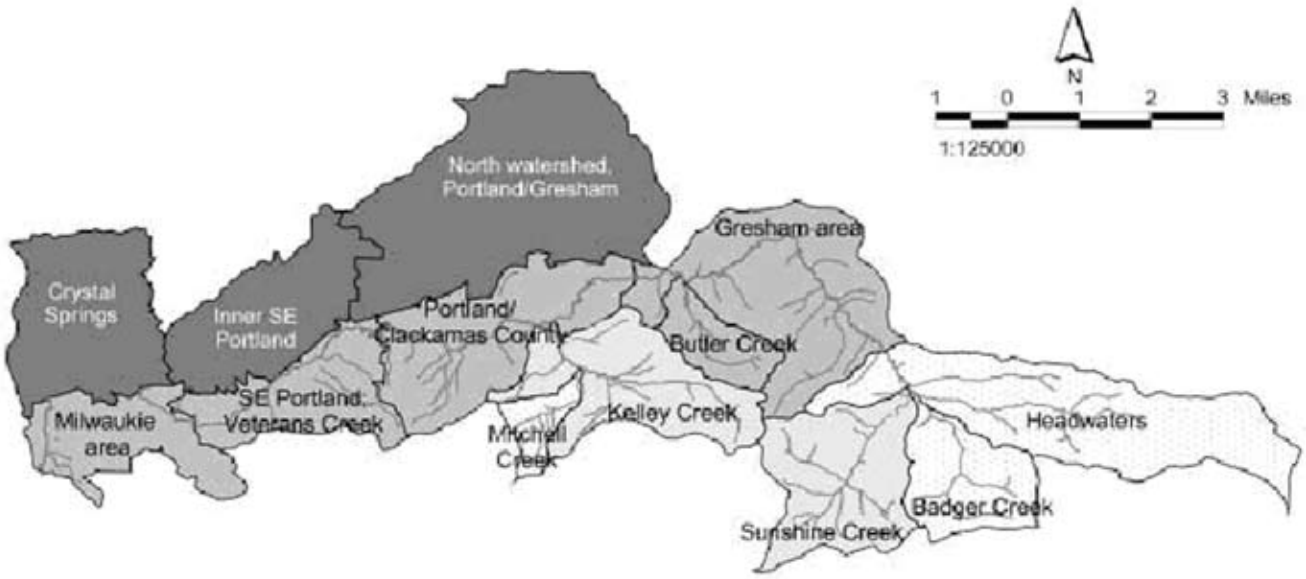
Check out *HWI*'s website (www.healthywaters.org) to find regional information about your watershed. If we do not have information for your region use the following template to create your own regional watershed information. Feel free to add or delete sections as needed.

We encourage you to share your watershed information with *HWI* so we can make it available for others through our website.

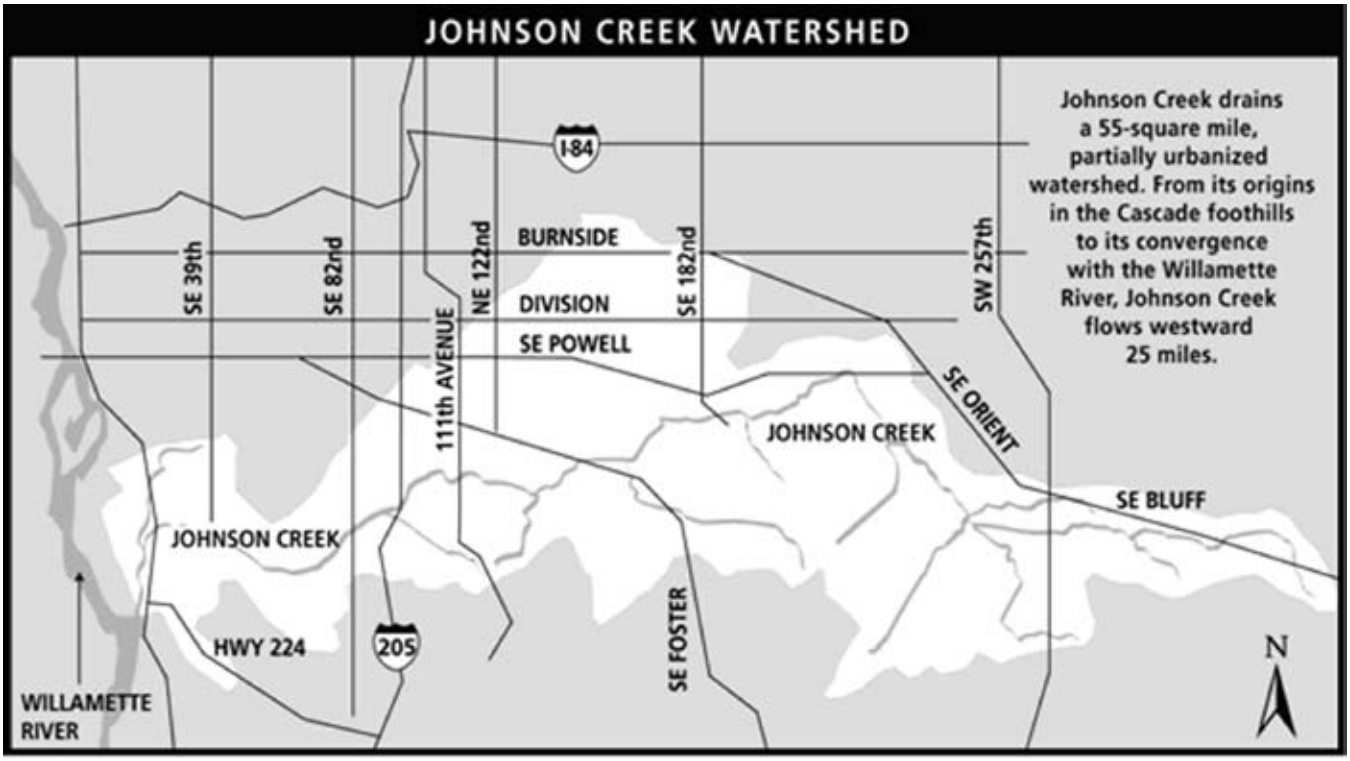
Johnson Creek Watershed
Regional Information



A watershed is the entire area, from ridgetop to ridgetop, which drains into a river or stream.



Sub-watersheds of the Johnson Creek Basin



JOHNSON CREEK HEADWATERS

The headwaters of Johnson Creek begin in the hills near the small, unincorporated area of Cotrell, southeast of Gresham in the foothills of the Cascades. The headwater region of the Boring Hills is around 750 feet above sea level. The creek flows westward approximately 25 miles to its confluence with the Willamette River in the city of Milwaukie. The watershed drains approximately 54 square miles (34,035 acres), and crosses six political boundaries—the cities of Gresham, Happy Valley, Portland, Milwaukie, and counties of Clackamas and Multnomah.

Some of the tributaries that feed into Johnson Creek are Crystal Springs Creek, Veterans Creek, Mitchell Creek, Kelley Creek, Butler Creek, Sunshine Creek, and Badger Creek.

Johnson Creek watershed is relatively flat topographically, and the slope of its mainstem, from headwaters to confluence, is atypical. A typical mainstem is characterized by a steeper slope at the headwaters, and a flatter slope towards the confluence.
Johnson Creek has more of a "geomorphologically" inverted condition.

GEOLOGY

Johnson Creek is a sub basin of the Willamette River, which drains the Willamette Valley. The Willamette Valley is a lowland that has accumulated a substantial thickness of sediment. The floodplain of Johnson Creek is thought to be a remnant of large glacial floods that occurred about 15,000 years ago. The 'Missoula floods' helped shape the Columbia River basin and the large, flat floodplain in the Lents area of the Johnson Creek watershed.

The basin-filling deposits of the Willamette Valley also include a substantial thickness of basalt lava that flowed into the region during the early stages of basin development. This lava, known as the Columbia River Basalt Group, occurs in the northern two thirds of the Willamette Valley. The basalt lava has been folded and faulted, and now forms a series of uplands that separate the Willamette Valley into a series of sediment-filled sub-basins. The basalt lava is exposed in the uplands separating the sub-basins, and lies beneath the valley-filling sediments in the intervening areas.

Soils:
The Willamette Valley is an old volcanic and sedimentary seabed that has been overlaid with gravel, silt, rock and boulders brought by the Missoula Floods from Montana and Washington between 10,000 and 15,000 years ago. The most common of the volcanic type is red Jory soil, which is found above 300 feet elevation (as it had escaped the Missoula Floods deposits) and is between four and six feet deep. Anything below 300 feet elevation is primarily sedimentary-based soil.

HISTORY

Native Americans traveled and set up summer camps throughout the watershed as they fished, hunted, and foraged for seasonally available foods. Before urbanization, the Johnson Creek watershed was a diverse area of upland and wetland forests with extensive vegetative growth. As pioneers settled along the banks of Johnson Creek, large ancient trees were cut and sawmills were built. United States government land surveyors supposedly named Johnson creek after William Johnson, an 1846 pioneer who in the 1850's built a sawmill near what is now the Lents neighborhood.

Riparian vegetation was removed and the wetlands along the lower segment of the creek were filled. The middle floodplains were cleared for farming to take advantage of the fertile soil deposited by frequent floods. By the 1920s, residential areas began to replace nurseries and farms, a trend that still continues.

In 1903 the Springwater Division Line, which ran alongside much of Johnson Creek, was developed for rail service. In addition to passengers, the trains hauled farm products to Portland markets.

Many communities developed along the rail line, including Sellwood, Eastmoreland, Lents, and Pleasant Valley. To encourage weekend rail use, the rail corporation developed destination parks, such as Oaks Amusement park, along the line. By 1990, the City of Portland had purchased much of the rail corridor. In the following years, Metro purchased additional portions of the line. The historic rail corridor is now the 21-mile recreational Springwater Corridor Trail that runs through the heart of the watershed, almost entirely along the creek.

One of the most significant changes in the watershed occurred in the 1930s when the Works Progress Administration (WPA) attempted to control flooding by widening, deepening, and rock-lining the creek, creating trapezoidal channel in 15 of the 26 stream miles. These actions disconnected the creek from its floodplain, degraded streambank conditions, and substantially altered Johnson Creek from its historical configurations. The actions did not, however, stop major flooding. Johnson Creek has flooded 37 times since 1942.

Salmon and trout were once plentiful in Johnson Creek, and at one time there was a small commercial fishery near SE 45th Avenue and Johnson Creek Boulevard, The last sightings of Johnson Creek "thick with salmon" range from the late 1940s to the early 1960s, although sightings of plentiful trout have been documented right up to the 1980s.

The largest flood known to date happened in 1964. Approximately 1,200 structures were flooded, and over the next several years many attempts were made to address flooding problems. Residents in the watershed were divided between those living in the floodplains and those living in the uplands. Heated debates over how flood control was to be paid for an what remedy or remedies, should be implemented have left plans for reservoirs, channelzation projects, and regional detention facilities sitting on the shelf.

The 1970s marked a period of residential grown in the watershed. Infill took place in the already densely urban areas. Many of the smaller farms in the upper watershed were converted to large nursery operations. The late 1980s through the 1990s brought several developmental pressures to the watershed. The activities include development on the slopes of the Boring Lava Domes, expansion of the urban growth boundary in the Kelly Creek tributary, urban renewal in Lents, and further infill of the frequently flooded areas along Johnson Creek.

CLIMATE

The climate of the Portland area can be described as mild with seasonal variation. Part of the year our weather pattern can be described as Marine West Coast with mild wet, winters. Our summer weather, which is usually hot and dry, is closer to a Mediterranean climate pattern. The average high temperature is 63□F., average low is 47□F. There are 155 days of measurable precipitation and an average rainfall of about 44 inches.

ISSUES OF CONCERN

72% of its 34,000- acre drainage area is inside the urban growth boundary

Water quality in Johnson Creek is listed as water quality limited for bacteria, summer temperature, and toxics. Commonly used pesticides and herbicides are not being detected at significant levels in Johnson creek, although DDT and Dieldrin still linger after their banning in the 1970s.

Temperature can be dangerously high for salmonids in July, temperatures above 75 degrees are lethal to steelhead and above 79 degrees are lethal to salmon. Oregon DEQ has set a 64 degrees F temperature limit for Johnson Creek.

Factors that affect WQ:

- Removal of streamside vegetation
- Heated industrial discharges,
- Summer stormwater run-off, and shallow detentions of water may elevate stream temperature.
- High temperature combined with animal waste and fertilizer runoff can also deprive the water of dissolved oxygen, which can impair fish migration.

Water Quantity:

Stormwater Run-off collects pollutants and sediments contributed by various upland activities. These pollutants and sediments affect the water quality of Johnson Creek.

Hydrology:

Johnson Creek's stream channel, flow patterns, and flood plain capacity have been significantly altered by development. Flooding in Johnson Creek results from direct surface runoff and increased ground-water discharge and poses problems in residential, commercial, and public areas. Commercial and residential development in the basin has likely affected both the high-flow and low-flow hydrologic conditions in the basin. Fewer permeable surfaces available for stormwater infiltration, the more quickly stormwater reaches the stream channel – hence increasing the likelihood of flooding.

Instream Habitat:

Channelization of Johnson Creek has significantly impacted the quality of instream physical habitat. Because the historical floodplain is disconnected or minimally connected to the creek through much of its length, flood flows cannot spread out and soak into the floodplain. Rather, flood flows are directed and concentrated into the main channel, increasing stream bed scour and degrading instream habitat for fish and other aquatic organisms. Floodplain fill and disconnection also eliminated off channel habitat along the mainstem. Off-channel habitat is extremely rare, and is a major component of current restoration projects like Kelly Creek. Johnson Creek has extremely low volumes of instream wood particularly large wood necessary for pool formation. In stream large wood is lacking because there are few large, mature trees along the steam banks. What large trees that do fall into the creek are often removed to prevent potential damage and flooding.

Fish:

Fish communities in Johnson Creek include both native and non-native species. Most of the native species present are thought to be tolerant of warm water and disturbed conditions. These include red-sided shiners, sculpin, suckers, and speckled dace. Historically large populations of salmon inhabited Johnson Creek
Numbers declined dramatically once urbanization began and after the channelization work was completed.

Johnson Creek is one of the region's last free-flowing urban streams and has received Federal listing for native fish. High winter and spring flows can flush out spawning gravel, egg nests, and protective woody debris. Low summer flows force salmon into pools and intermittent tributaries that may dry up and strand them.
Winter steelhead trout and Chinook Salmon populations that travel through the lower Columbia River basin have been listed as "threatened' species", coho and sea-run cutthroat trout have been proposed for listing.

Sensitive species:

Sensitive species know to reside in the riparian areas of Johnson Creek include three salamanders species(long toed, northwest and Columbia, two frog species, and one toad species. Painted turtles have been identified in the upper watershed (east of 162nd Street). Other sensitive species have been sighted in the following specific areas: salamanders at Kelley Creek; great horned owls, red-legged f frogs, hawks, and coyotes and Tall bugbane at Powell Butte.

MACROINVERTEBRATES

Benthic macroinvertebrates are an important source of food for fish and other aquatic organisms. A study conducted by Portland State University in 1999 sampled sites monthly for diatoms, macroinvertebrates, and water chemistry. Benthic communities were found to be degraded in comparison to regional reference creeks within the same ecoregion.

Wildlife:

Johnson Creek acts as a wildlife corridor for the passage of species not normally observed in large cities, including deer, coyote, bear, cougar, and many woodland and meadow birds. A large or exhaustive database of information is not available on wildlife resources and their habitat throughout the Johnson Creek watershed.. It is believed that the diversity of wildlife species in the watershed has been significantly reduced. Large mammals were once common, such as black bear, bobcat, cougar, wolf, fox, elk, and coyote. Birds are the most abundant wildlife forms living in urban and rural areas within the watershed and Pileated woodpeckers have been observed in the Boring lava Domes forest.

Demographics:

Population:
Since the days of William Johnson, many, many people have built homes and businesses in the Johnson Creek watershed. In fact, now there are over 170,000 people that live in the Johnson Creek watershed. That means that about 3,150 people live in each square mile of this watershed! In the lower and middle reaches of the watershed, the land has been developed into homes and businesses, but in the upper watershed there are still many farms and farmhouses. Even through there are some farms in the watershed, most people classify Johnson Creek as an urban stream.

Land Use:

72% lies within the urban growth boundary
Zoning by Percent

Single Family Residential	57%
Rural	8%
Multi-Family Res.	12%
Parks & Open Space	13%
Industrial	(0%)
Commercial	10%

Agricultural:

Cultivated crops or pastures	50%
Tree and ornamental nurseries	29%
Cultivate Cane Crops	2%
Not classified	19%

Vegetation:

The Willamette Valley ecoregion includes oak woodlands, grasslands (including oak savanna), wetlands (including wet prairies), riparian, and aquatic habitats. Historical accounts indicate that prior to European settlement, much of the Willamette Valley was covered by native grasses and forbs. The Calapooia people regularly set fires to improve hunting an travel. The fires helped maintain the valley's mosaic of grasslands, oak savannas, wet prairies and other open habitats. Since the 1850's, much of the Willamette Valley ecoregion has been altered by development (agricultural or urban, particularly affecting oak woodlands, oak savanna, grassland, riverine and wetland habitats.

The Johnson Creek watershed contains a mosaic of vegetation types, including agricultural lands, urban and suburban landscapes, upland forests, riparian woodlands, and wetlands. Because of extensive logging and clearing, remnants of predevelopment vegetation are rare. About 57 percent of the watershed is currently vegetated, including grass, trees, blackberries and all other types of vegetation.

Uplands:

The forest that historically coved the Johnson Creek watershed ridges and lowlands was substantially cleared in the early 1900s for agriculture, timber production, and urban development. In the mid and late 20th century some areas such as the buttes and ridges in the south central and eastern part of the basin were left to regenerate into a second growth forest. Forest clearing of second growth has increased dramatically in recent years as housing development expanded from the lowlands onto the ridges and hillside slopes.

Wetlands:

Over time, development and associated changes to the landscape have highly impacted the wetlands within the Johnson Creek Watershed. The remaining wetlands are extremely diverse. They range in size from the 19- acre Beggars Tick marsh in the Lents area, to many smaller emergent wetlands in the basin of less than a tenth of an acre. Many wetlands in the basin have good connectivity with undeveloped open space, upland habitats, and the Johnson Creek riparian corridor. Several significant areas of wildlife breeding and nesting are found in wetlands within the basin with dense breeding populations of amphibians, including red-legged frogs.

Riparian Areas:

Channelization and development have greatly reduced riparian vegetation throughout most of the Johnson Creek Watershed. In most of the watershed, riparian vegetation is narrow, minimal, or lacking. Thirty-four percent of the watershed has little or no riparian vegetation present, and an additional 32 percent has riparian vegetation less than 100 feet wide. The riparian corridors are also highly fragmented by frequent road crossings. Generally, vegetation in riparian areas is dominated by blackberry or young native plants and lacks large mature trees. However, riparian area vegetation quality is improving. Local agencies and citizen groups have ramped up efforts to remove invasive and non-native plants and replant natives, creating more canopy closure.

Invasive Non-native Species:

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion.

Watershed Inventory

Watershed Inventories are worksheets that can be used to track student knowledge. They can be used before, during and after program participation to see how well students learned about their watershed. They are useful for in-class assignments and for generating ideas for student independent research.

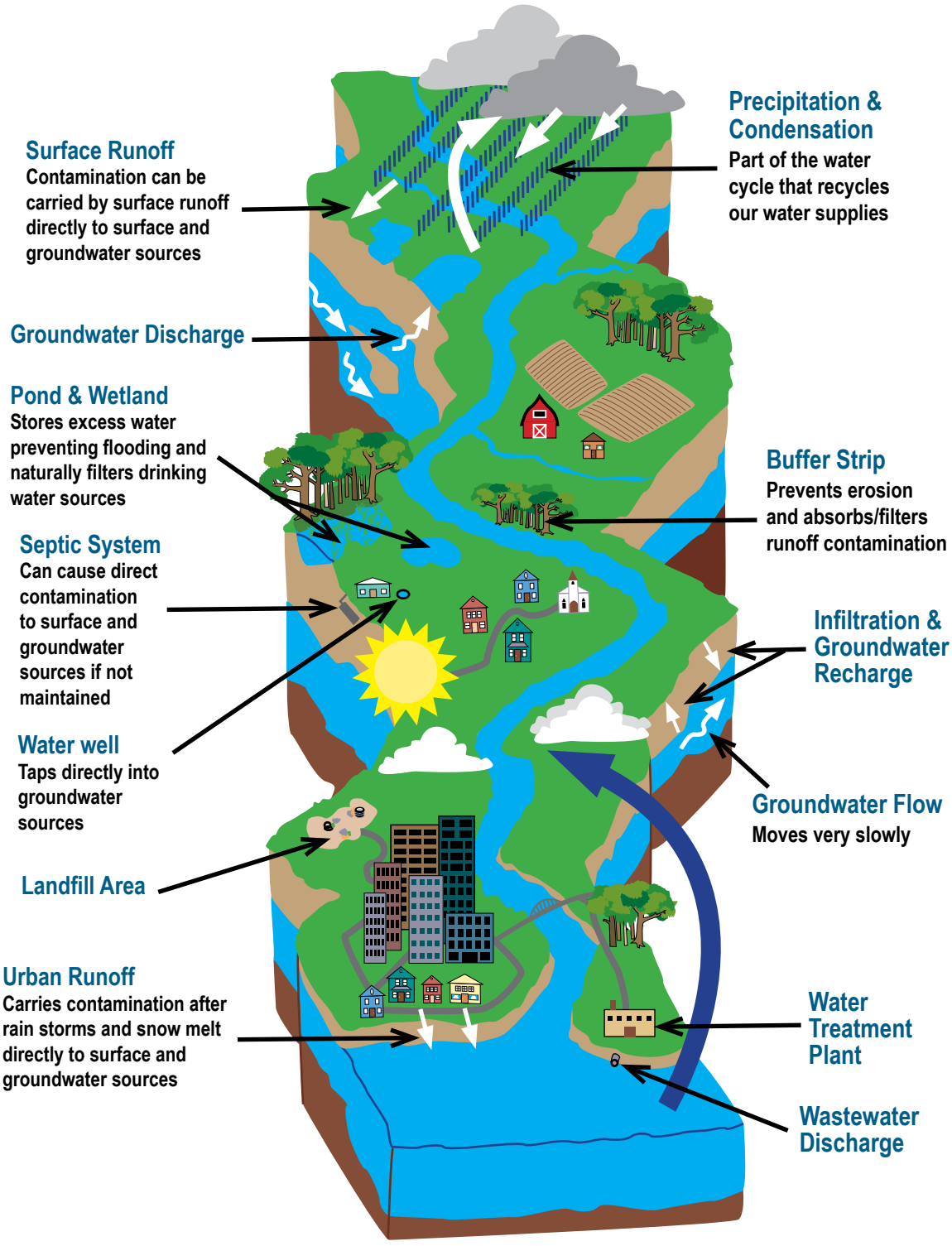
Inventories can include:

1. Basic watershed information (name, length, width)
2. Climate
3. Geology/Topography
4. Water Resources
5. Soils
6. Vegetation
7. Fish
8. Wildlife
9. History
10. Demographics
11. Land & Water Uses
12. Water Quality/Quantity Concerns
13. Areas Prone to Flooding or Drying Up

Check out *HWI*'s website (www.healthywaters.org) to find a Watershed Inventory for your region. If an inventory does not yet exist for your watershed, use the template on the following pages or *The Streamkeeper's Field Guide* "Field Procedure: Watershed Inventory" on pg.32 (student data pages 38-41). Inventories should be created with an answer key!

Please share new inventories with *HWI* so that we can make them available to others through our website.

Johnson Creek Watershed Inventory



A watershed is the entire area, from ridgetop to ridgetop, which drains into a river or stream.

JOHNSON CREEK WATERSHED INVENTORY

Name_____ Date_____

Basin name_____ Subbasin name_____

Watershed name_____ USGS quad(s)_____

Begins in_____ Flows through_____

Ends in_____(towns, counties, states, regions, etc.)

Drains into_____(body of water)

Square miles_____ Approx. length_____ Width_____

CLIMATE

Average yearly precipitation_____

Most of the precipitation is in the form of_____

Most precipitation occurs in the month(s)_____

Which areas of the subbasin receive the most precipitation?_____

Which areas receive the least amount of precipitation?_____

Droughts most commonly occur in month(s)_____ Floods?_____

Coldest month of year_____ Warmest month_____ Yearly temp range_____

GEOLOGY / TOPOGRAPHY

Describe briefly the geologic history that has shaped your watershed: _____

_____

_____

Describe the physical characteristics of the different reaches:

	Upper	Middle	Lower
Uplands (mountains, hills, flat)	_____	_____	_____
Valley (broad, medium, narrow)	_____	_____	_____
Gradient (steep, medium, gentle)	_____	_____	_____
Channel (straight, meandering)	_____	_____	_____
Bottom (boulder, cobble, gravel, Fines)	_____	_____	_____

Predominate rock types: igneous____ sedimentary____ metamorphic____

Specific rock types that are present _____

Name the four highest peaks in the subbasin _____

_____

Highest elevation point_____ Lowest point_____
(include elev and location)

Geologic activity: earthquakes____ volcanic eruptions____ landslides____ other_____

WATER RESOURCES

Where do the headwaters originate for Johnson Creek? _____
(spring, glaciers, snowmelt, etc.)

Badger Creek? _____

Butler Creek? _____

Kelly Creek? _____

Mitchell Creek? _____

Length of your closest stream_____

Names of tributaries_____

Names of lakes_____

Number of wetlands (approx.)_____

Areas underlain by aquifers (if any)_____

SOILS

Predominate soil types_____

Areas with soil suitable for farming_____

Areas with soil unsuitable for development_____

Areas with potential soil erosion problems_____

VEGETATION

List the native and introduced plant species that dominate the different plant communities of your watershed:

	Native	Introduced/Non-Native
Upland Forest	_____	_____
Riparian	_____	_____
Grassland	_____	_____
Other plant communities	_____	_____

Describe how historic vegetation patterns differed from current vegetation throughout the subbasin.

_____

_____

_____

Percent of your watershed now covered by native plant vegetation_____%

Reasons for loss of native plant vegetation_____

Endangered or threatened plant species_____

FISH

Native Species_____

Non-native species_____

Locations of fish hatcheries and species produced_____

Types and locations of barriers to fish migration_____

WILDLIFE

Native species_____

Non-native species_____

Key wildlife habitat areas_____

HISTORICAL

The earliest human inhabitants were_____

Describe briefly the settlement of your watershed: _____

_____

_____

DEMOGRAPHICS

Current watershed population_____ Projected pop. in 10 years_____20?_____

Watershed population 10 years ago_____ 50?_____ 100?_____

Areas where most of the people live_____

List towns, cities, and counties_____

List jobs that depend on the river or river use:_____

_____

What makes people want to live (or not) in your watershed? _____

_____

LAND & WATER USES

Estimate the % of your watershed zoned for each land use

Rural residential_____%

Urban/suburban residential_____%

Commercial_____%

Industrial_____%

Agricultural_____%

Forestry_____%

Mining_____% Type of mining_____

Parks/open space_____%

Other recreation_____%

Public land_____% Private land_____%

Sources of domestic water supply for watershed residents_____

Areas that rely on septic tanks_____

Location of sewage treatment plants (if any) servicing watershed residents: _____

_____

Altered hydrology (dams, diversions, detention systems, culverts, dikes, drained wetlands, etc.)

Type of alteration	Location	Purpose	Impact
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

WATER QUALITY/QUANTITY CONCERNS

List pollutants of concern and their potential sources (include locations if possible)

Pollutant	Point Source	Nonpoint source
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

AREAS PRONE TO FLOODING/DRYING UP

Location	Circle One	Dates	Why?
_____	Dry/Flood	_____	_____
_____	Dry/Flood	_____	_____
_____	Dry/Flood	_____	_____
_____	Dry/Flood	_____	_____
_____	Dry/Flood	_____	_____

Programs & Activities

The purpose of HW is to connect students with their local watershed and create a watershed-as-home concept. Utilizing local resources including experts, community partners and existing educational materials, provides the most effective and efficient way of connecting students with their home waters.

It can be overwhelming and especially time consuming to make and maintain connections with local partners who are willing and able to assist in the delivery of watershed education in the classroom. If you have a Regional Education Coordinator, Natural Resource Coordinator or Community Outreach Coordinator in your school or watershed, work with them to help plan your HW schedule. *HWI* has developed some tools to help get you started working with your coordinator or on your own. We strongly request the sharing of program and activity information once you discover what works for you. This information will assist *HWI* in compiling a catalog of information that can be shared between teachers, schools and districts.

We encourage connecting with community partners as often as possible. If local watershed education program providers are scare, there are a plethora of exceptional curriculum guides you can use. All programs and activities should support authentic educational experiences, rooted in relevant, experiential and place-based learning.

The Foxfire Approach to Teaching and Learning (http://www.foxfire.org/teachi.html) can be used to guide whether a program or activity should be included in HW.
The Core Practices of the Foxfire Approach include:

- The work teachers and learners do together is infused from the beginning with learner choice, design, and revision.
- The academic integrity of the work teachers and learners do together is clear.
- The role of the teacher is that of facilitator and collaborator.
- The work is characterized by active learning.
- Peer teaching, small group work, and teamwork are all consistent features of classroom activities.
- There is an audience beyond the teacher for learner work.
- New activities spiral gracefully out of the old, incorporating lessons learned from past experiences, building on skills and understandings that can now be amplified.
- Reflection is an essential activity that takes place at key points throughout the work.
- Connections between the classroom work, the surrounding communities, and the world beyond the community are clear.
- Imagination and creativity are encouraged in the completion of learning activities.
- The work teachers and learners do together includes rigorous, ongoing assessment and evaluation.

PLANNING & TRACKING

The *HWI* Watershed Education Matrix was developed to help in planning and tracking HW programs and activities. The matrix is broken by watershed education category which is further broken down by discipline. The overarching watershed theme inherently provides a multidisciplinary approach to education. Teachers across disciplines can relate student learning to real events, features and functions found in the local watershed. When planning programs and activities, consider working in partnership with teachers from other disciplines (or other grade levels) to offer students repeat opportunities to connect with their watershed from a variety of perspectives.

Each program or activity used to connect students to their home waters should be entered into the matrix. It can be used for individual classrooms or the entire school. Entries are based on the number of hours students spend annually (school year) on a particular program or activity. The number in each box should be equal to:

(# of students) x (# of hours)

For example:

If all 6th grade students from Sunnyside Environmental School participate in a watershed mapping activity with their science teacher:

(3-6th grade classes) x (32 students in each class) x (2 hours on the activity)
3 x 32 x 2
192 hours

For this example, you would enter "192" into the box for "Watershed Mapping" – "Science". If the students were participating in a 1000 Drops mapping activity, you would list "Healthy Waters Institute" as the provider.

Detailed descriptions for each entry should used to track actual program information. Data pages have been included for your use.

A few notes:

- Keep it simple
- Use the matrix to bring partners and teachers together
- Share it with school administration as exhibition of students learning and the valuable contributions of community partners
- Include examples of how programs also satisfy standards and benchmarks
- Keep track of as much information you can about the programs – it will be invaluable to share with others
- Provide feedback to the *HWI* always and often – share completed documents, comments and questions

If you need more support for teaching students about their home watershed, or just want to keep your school informed – consider using the "Watershed Education Partnership Agreement".

USING THIS BINDER

Use this binder to keep track of your regional HW toolkit. We've included sections for each component of the toolkit along with tabs to segregate each program area. There's a worksheet at the front of every program section to keep track of local partners who can help. Add new program and activity pages as you discover them. We've included some examples to help get you started.

Let us know how you're connecting students with their home waters so we can share your ideas and accomplishments! Check in with *HWI* to find new ideas from others in the field.

PROGRAM & ACTIVITY DESCRIPTION

Teacher Name				
Email				
Discipline				
Grade Level				
Name of Activity				
Description				
Where (circle)	In-Class	Schoolyard	Outdoor Field Trip	Indoor Field Trip
Length				
Benchmarks/Standards				
Partners				
Partner Contact Info				
Where to find activity				

PROGRAM & ACTIVITY DESCRIPTION

Teacher Name				
Email				
Discipline				
Grade Level				
Name of Activity				
Description				
Where (circle)	In-Class	Schoolyard	Outdoor Field Trip	Indoor Field Trip
Length				
Benchmarks/Standards				
Partners				
Partner Contact Info				
Where to find activity				

Healthy Waters Institute®

CATALOG FOR INVITATION

Year:

School:

Address:

Contact:

Phone #:

Email:

Provider	Outdoor Ethics						Climate						Geography						Soils & Geology						Forestry & Vegetation						Fish						Wildlife					
	Arts	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*
TOTAL HOURS																																									

History						Demographics						Water						Economy						Ecology						Eco-Art						Local Partners						
Arts	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	*Arts*	*English*	*Language Arts*	*Mathematics*	*Science*	*Social Sciences*	**TOTAL HOURS**

Watershed Education Partnership

The Healthy Waters Institute (*HWI*) seeks to forge a lifelong, caretaking bond between students and their local watershed, ensuring the health of Oregon's rivers and streams for generations. By uniting education, community, and local stewardship, *HWI* takes an active role in cultivating the next generation of watershed stewards.

Teachers, schools and community organizations throughout Oregon are actively connecting students to their local watersheds and supporting youth as they move from student to steward. Although these efforts are intricately interwoven, they are often disconnected.

HWI requests your help in tracking participation in watershed education programs and activities. Successful tracking will result in:

- Increased communication and collaboration within schools
- Increased connections between schools and community partners
- Dynamic catalog of programs and activities accessible to teachers statewide

HWI will assist schools incorporating watershed education by offering:

- Educational materials
- Teacher grants – up to $500
- Student grants – $200 maximum for high school students
- Travel and substitute teacher reimbursement
- Networking opportunities with diverse community partners
- Student scholarships – four $1500 awards for juniors and seniors
- Publications – healthy waters kids and journal
- Website – resources, opportunity for students to share projects
- Assistance in developing student summits
- Trainings, workshops and consultation

Signing this document demonstrates agreement with the following:

"I support the work of *HWI* and local community partners in working with teachers and schools to satisfy curriculum and graduation requirements through watershed education while equipping our students with essential lifelong learning skills. I recognize the value of incorporating watershed education into my classroom. I will provide *HWI* with necessary information to support their statewide watershed education efforts."

Participating teachers, please sign below:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Name of School: _____

Total # of students participating in watershed education: _____

Total # of student hours on watershed education: _____

Signature of School Administration, Title:	Date:
_____	_____
_____	_____

Geography

PRACTICE READING A TOPOGRAPHICAL MAP

- Use The Stream Scene "Tour of a topo" (pg.71) with a State of Oregon Map
- Trace the watershed boundaries

CREATE YOUR OWN WATERSHED MAP

- Use The Stream Keeper's Field Guide "Creating your own Watershed Map" (pg.24)
- Compare to a real map of your watershed

ADDITIONAL ACTIVITIES

- Use regional maps of your watershed to identify the headwaters, mouth, bodies of water, ridgelines, communities, industry, highest elevation, lowest elevation, mountains, buttes, rivers, lakes and streams
- Create vocabulary lists for topographical maps
- Create writing prompts for your students
- Make 3-D Models (The Stream Scene #19 pg.41 & "What a relief" pg.91)
- Have your students create crossword puzzles and word searches
- Find your Ecological Address (The Stream Scene "A sense of place: your ecological address" pg.53)

LOCAL CONTACT

Name				
Organization/Affiliation				
Address				
Phone				
Email				
Type of Activity/Program				
Description				
Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

LOCAL CONTACT

Name				
Organization/Affiliation				
Address				
Phone				
Email				
Type of Activity/Program				
Description				
Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

LOCAL CONTACT

Name				
Organization/Affiliation				
Address				
Phone				
Email				
Type of Activity/Program				
Description				
Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

Creating Your Own Watershed Map

Main Focus: Geography
Benchmarks:

Approximate time: 45 mins.

This activity helps students define a watershed. It also teaches students about the specific watershed in which their school is located. In Creating Your Own Watershed Map students can learn about the path of water from higher elevations to lower elevation points of the watershed.

COMMON CURRICULUM GOALS AND BENCHMARKS

The Creating Your Own Watershed Map activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

Geography – Understand and use geographic skills and concepts to interpret contemporary and historical issues.

Earth and Space Science – Understand physical properties of the Earth, and how those properties change.

The Arts – Apply ideas, techniques and processes in the arts.

GOALS AND OBJECTIVES

Students will:

- Be able to verbally describe a watershed
- Be able to verbally identify which watershed their school is located
- Be able to name three components of a watershed unit
- Be able to verbally describe contour lines and map legends

MATERIALS

- USGS topographic maps of your local river and surrounding tributaries.
- Ruler
- Colored Pencils and Magic Markers

PROCEDURE

1. Determine the boundaries of your watershed

2. Locate the outlet point of your watershed. It will be the lowest elevation point in your watershed and in most cases will be the mouth of your stream.

3. Trace the stream from its mouth up to its tributaries. Using a pencil, make marks along the stream and its tributaries every inch or so, dividing them into one inch sections.

4. At each mark, draw a line perpendicular to the stream or tributary, running out in both directions.

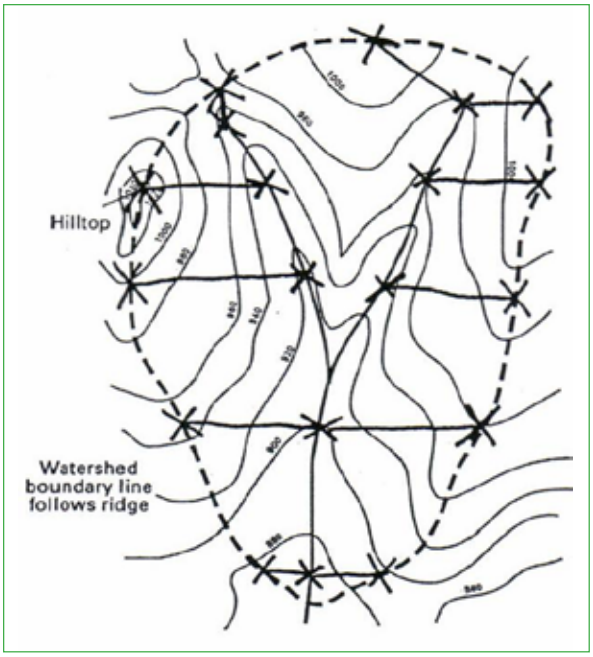
5. Follow each perpendicular line out from the stream or tributary until you reach a maximum elevation. Mark all these high elevation points with an "X".

6. Locate the beginning of each tributary, or the place where the stream's water originates. Extend a line out from each of these locations, in the direction opposite to the flow of water. Follow these lines until you reach a maximum elevation. Mark the high points with an "X".

7. Connect all the high points with a line, following the ridges and crossing slopes at right angles to contour lines. The line resulting from 'connecting the dots' will be the boundary of your watershed. Double check your boundaries to ensure accuracy, and then mark them with a pen or magic marker.

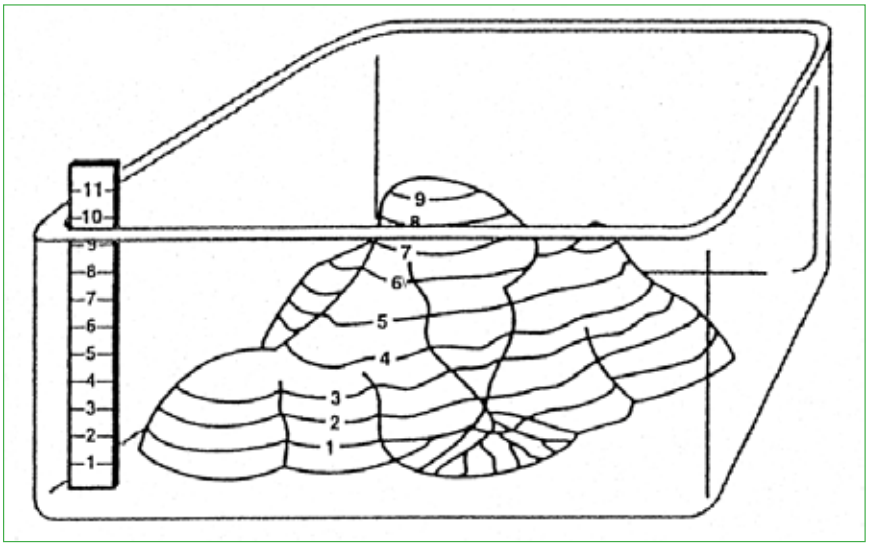
Highlighting Features on Your Map

1. Highlight your stream and its tributaries. You will be able to see the pattern of the stream network. Count the number of tributaries and classify the various streams to their orders.

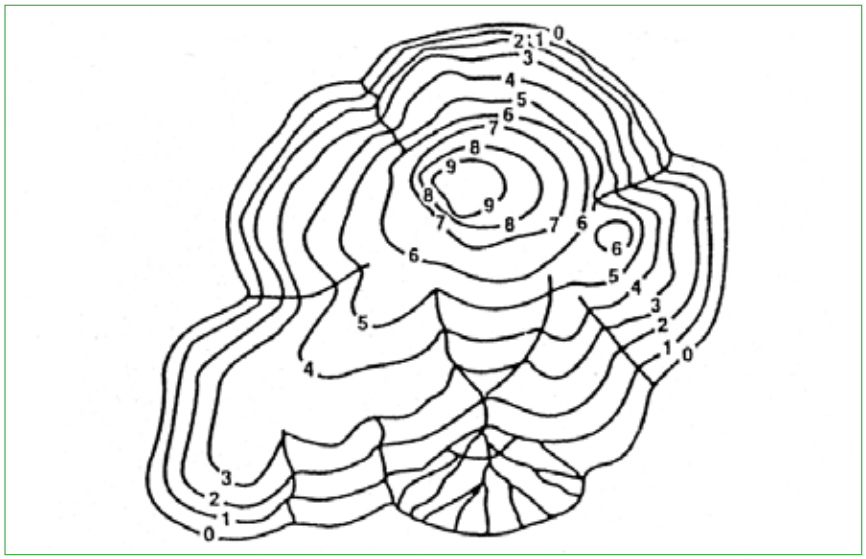


2. Since you know the scale of the map, you can estimate the length of each stream. Lay a piece of string along scale at the bottom of your map and mark off the inches. Next, lay the string along your stream and estimate its length. Note the locations where tributaries enter your main stream.

3. Pinpoint the other surface water features, such as lakes and wetlands. Also trace the roads and highways. How many roads cross your watershed? What political boundary, such as counties, cities, states, and counties does the watershed cross? Locate other features of interest, such as geologic formations, mountain peaks and recreational sites.



Introducing Students to Contours



Top View of Contour

How Plants Grow

(Adapted from Project Learning Tree Environmental Education Activity Guide)

Main Focus: Vegetation
Benchmarks:

Approximate time: ?? mins.

COMMON CURRICULUM GOALS AND BENCHMARKS

The How Plants Grow activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

???

GOALS AND OBJECTIVES

Students will:

- Be able to explore adaptability.
- Be able to determine what factors are necessary for plant growth.
- Be able to compare plant growth under different environmental conditions.

MATERIALS

- 50 bean, pea, or alfalfa seeds
- Large clear jar
- Paper towels
- 20 planting containers (small pots, egg cartons, cups)
- Potting soil
- Masking tape
- Pens
- Ruler

PROCEDURE

1. Approximately three weeks before doing this activity, put about 50 seeds in a clear jar on a layer of moist paper towels. Place the jar near a window. Monitor the seeds daily to keep them moist until they have sprouted and are ready to plant. This is a good time to discuss the needs/structure of seeds.

2. Divide students into research teams.

3. What does a plant need to grow?

4. Set up the experiment to test factors of light, water and soil. Don't forget to label each container so they don't get mixed up. For example; No Light 1, 2, 3, 4 or No Water 1,2,3,4. You have the option to be creative and test an additional factor.

Control
Plant four seedlings in separate containers of soil near a window and water as needed.

Test for light
Plant four seedlings in separate containers of soil and place them in a dark cabinet or closet. Water as needed.

Test for water
Plant four seedling in separate containers of soil and place near a window. Do not water.

Test for soil
Put four seedling in a moist paper towel and place near a window. Be sure that the paper towel doesn't dry out during the experiment.

Student choice
Students may choose a different factor to test. Once, students decided to test the affect of placing crystals in the container with the plant. Sometimes this option helps to get students more excited about the experiment.

5. Hypothesize. What factors are essential for plant growth? Which plants will grow the fastest? Why? Will any plants not grow at all?

6. As plants grow, students should measure plants' heights and create a bar graph to present results. Measure the plants daily or weekly.

QUESTIONS

1. Which plants grew the most? Which grew the least?
2. Did you observe other differences among the plants? If yes, describe.
3. What does a plant need to grow? How do they get what they need?
4. Describe what happens when a plant is deprived of sunlight? What about water? What about soil?
5. Which part of the plant is affected most in each of these experiments?
6. If you were going to plant a tree on your school grounds, where might you plant it? How come?
7. If you were to plant a tree on your school grounds how might you benefit from it?

History

- Read "The Bath" in "Easy Street" (Project WET pg.382). Brainstorm with students how they think their watershed has changed throughout history.
- Create writing prompts for your students - first person account of what it would have been like around the time of "The Bath".
- Recruit members from your local Historical Society to give a presentation to your class with pictures and stories
- WebQuest - use as a research tool for answering critical questions (Hometown Waters pg.WQ1)
- Create a mural of your watershed's historical timeline with drawings for major dates or events (Hometown Waters pg. H5)
- "Nature Rules" – (Project WET pg.263)
- "Old Water" – (Project WET p.171)

LOCAL CONTACT

Name				
Organization/Affiliation				
Address				
Phone				
Email				
Type of Activity/Program				
Description				
Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

LOCAL CONTACT

Name				
Organization/Affiliation				
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Timeline Mural

Main Focus: History
Benchmarks:

Approximate time: 1 hour

The Timeline Mural is an activity that will introduce students to the many historic events in the Johnson Creek Watershed. Once the students have completed their watershed investigations, they can use their data from Webquest and Watershed inventory to create a Timeline Mural.

COMMON CURRICULUM GOALS AND BENCHMARKS

The Timeline Mural activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

Geography – Understand and use geographic skills and concepts to interpret contemporary and historical issues.

History – Relate significant events and eras in United States and world history to past and present issues and developments.

Social Science Analysis – Design and implement strategies to analyze issues, explain perspectives, and resolve issues using the social sciences.

Science Inquiry – Use interrelated processes to pose questions and investigate the physical and living world.

The Arts – Apply ideas, techniques and processes in the arts.

GOALS AND OBJECTIVES

Students will:

- Be able to verbally describe the beneficial (both current and historical) factors of having Johnson Creek flow through the Portland area.
- Be able to verbally describe the health of the Johnson Creek Watershed.
- Be able to understand and discuss the threats that are currently threatening Johnson Creek.

MATERIALS

- Colored pencils and Magic markers
- Butcher paper and/or poster-board
- Scissors
- Tape and glue-sticks
- Watershed Inventory Sheet
- Local newspapers or local magazines

PROCEDURE

Groups of 3-4 students can research specific time periods of Johnson Creek and it's Watershed. Students can create drawings for major dates and events that they have researched to create the Timeline Mural. Once completed, students can then place their piece of the Timeline Mural around the classroom in its correct position to the others.

Water

WATER CYCLE

- Review the water cycle with your students
- Use "The Incredible Journey" (Project WET pg.161)
- Review graphs and graphing techniques

WATERSHED MODEL

- Create a simple watershed model (Hometown Waters pg. G7)
- Find out how water moves through a watershed

STREAMFLOW

- Use "Snow way!" (Hometown Waters pg. W5)
- Share your regional data (precipitation vs. streamflow) with *HWI*
- Have your students create a graph of data and compare with regions throughout Oregon

ADDITIONAL ACTIVITIES

- "Hold that raindrop" (The Stream Scene pg.117)
- Get your students to track water use at home with a "Water Tally Sheet" (http://www.nationalgeographic.com/geographyaction/rivers/ax/PDF1_WaterTally.pdf) or "Home Water Audit" (http://www.portlandonline.com/shared/cfm/image.cfm?id=31562)
- "Get the Ground Water Picture" (Hometown Waters pg. W11)
- "Water Meter" (Project WET pg.271)
- "Just Passing Through" (Project WET pg.166)

PERSONAL WATER USE

- "Water Tally Sheet" or "Home Water Audit" – what did your students discover about their water use at home? Discuss. Have students graph their results.
- Neighborhood inventory – what do your students see in their neighborhood: Wildlife, pollution, water, drains, vegetation, cars? Have them record their observations and discuss in class.
- "Common Water" (Project WET pg. 232)
- Have students write in journals about how what they can do to conserve water.
- "Every Drop Counts" (Project WET pg. 307)
- "A Grave Mistake" (Project WET pg. 311)

LOCAL CONTACT

Name				
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Email				
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Description				
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From the Source to the Sink

CONTACT

Briggy Thomas
Education Program Manager
Portland Water Bureau
503-823-7407
mylat@water..ci.portland.or.us

With all this talk of watersheds, let's not forget one of their most essential functions! The people of Portland and surrounding areas depend on the Bull Run watershed for our drinking water. Also, Portland is one of the few cities in the U.S. where open reservoirs still exist. The Portland Water Bureau offers extensive resources for teachers and students to better understand their drinking water system. Both classroom programs and even field trips are provided free of charge on a limited basis.

Contact Briggy Thomas to find out more about the following program and field trip opportunities.

CLASSROOM ACTIVITIES

Tap Water Testing - Students will test their own tap water or compare tap water quality to bottled water quality. Tests include turbidity, chlorine, total hardness, and pH. Minimum time commitment of 1.5 hours (2 hours recommended.) Grades 4-12.

Water Tasting - Students will evaluate taste, odor, and color of various water samples through investigation, analysis, and explanation. Minimum time commitment of 30 minutes. Grades 4 - 12.

Home Water Audit - Students will learn how to use water audit kits to assess their indoor and/or outdoor water use and find ways to reduce it. Minimum time commitment of 30 minutes. Activity continues as a week long assignment. Grades 2-12.

So You'd Like to be a Salmon? - Students will experience first hand just how difficult the obstacles are that face Bull Run River Salmon and Steelhead. Learn what we can do to ensure plenty of water for fish and for people. Minimum time commitment of 30 minutes. Grades 2-8.

Groundwater Model - Students will learn about groundwater anatomy and observe groundwater movement in our physical groundwater model. Learn about Portland's vital backup and emergency water supply. Minimum time commitment of 30 minutes. Grades 2-12.
Hydraulic Gradeline Model - Students will learn about water pressure, pressure zones and hydraulic gradeline by observing this physical model and making predictions about what water will do under various pressure conditions. Minimum time commitment of 30 minutes. Grades 5-12.

All the Water in the World - Students will test their knowledge about the distribution of fresh water throughout the world. Minimum time commitment of 30 minutes. Grades 4-12.

So Little Water - Another worldwide water distribution activity for younger students. This is a demonstration of water distribution with student observation and discussion. Minimum time commitment of 20 minutes. Grades 1-4.

Water System Overview - Students will receive an overview of the water system, either by video, slide show or booklet. Students will understand how and where water travels from the Bull Run watershed to their faucet. Minimum time commitment of 30 minutes. Grades 3-12. Slide show: Grades 6-12.

FIELDTRIPS

The Portland Water Bureau offers opportunities for school and community groups to visit the Water Operations Facility at 1900 N. Interstate, just north of Broadway.

During an Operations Facility visit, a typical class will divide into 3 groups and rotate through a series of drinking water-related activities. The facility's site-specific activities include a visit to the Portland Water Bureau's water quality laboratory, where students test tap water, as well as a visit to the bureau's meter shop, where students learn how to take apart, put together and test water meters. The combination of activities used for your class can be tailored to meet your students' abilities and needs. The list of Portland Water Bureau-led educational activities in your classroom includes many of the other potential activities that your students can participate in on a visit to the Water Operations Facility.

Some things to know about bringing your class to the Portland Water Bureau Operations Facility:

- A minimum of 3 to 3 ½ hours is recommended for a visit by one class of 20-30 students. This does not include transportation time.
- One class of students can be accommodated per day.
- Public transportation can be used to arrive at the Portland Water Bureau Operations Facility.
- Tour opportunities are limited. Please allow a minimum of three weeks advance notice when scheduling a visit. Allowing advance notice does not guarantee availability of field trip opportunities.

Get The Ground Water Picture

Main Focus: Water
Benchmarks:

Approximate time: ??

Since ground water is hidden beneath the Earth's surface, students do not have the visible reference point they do when looking at water in lakes or rivers. However, groundwater is extremely important to people because it provides us with drinking water and is used for irrigation. *What else might it be important for?* Groundwater can be recharged by rain or snow melt in a few ways. Usually rain soaks into the Earth right where it lands and moves into the water table. Sometimes it is pulled even deeper into confined aquifers. At other times, water is prevented from being absorbed and it runs into local streams where a small percentage of it may be returned to the aquifer below. *What factors do you think prevent water absorption?* Portland, Clackamas, and Milwaukie are growing areas in Oregon; this population growth is accompanied by an increased demand for water. *How do you think development affects groundwater recharge?*

COMMON CURRICULUM GOALS AND BENCHMARKS

The Get the Ground Water Picture activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

Geography – Understand and use geographic skills and concepts to interpret contemporary and historical issues.

Earth and Space Science – Understand physical properties of the Earth and how those properties change.

GOALS AND OBJECTIVES

Students will:

- Be able to identify the parts of a ground water system
- Be able to compare movement of water through diverse substrates
- Be able to relate different types of land uses to potential ground water contamination

MATERIALS

- 4 Clear 16-ounce soda bottles
- Gravel
- Sand
- Clay
- Hand-held magnifying glass

PROCEDURE

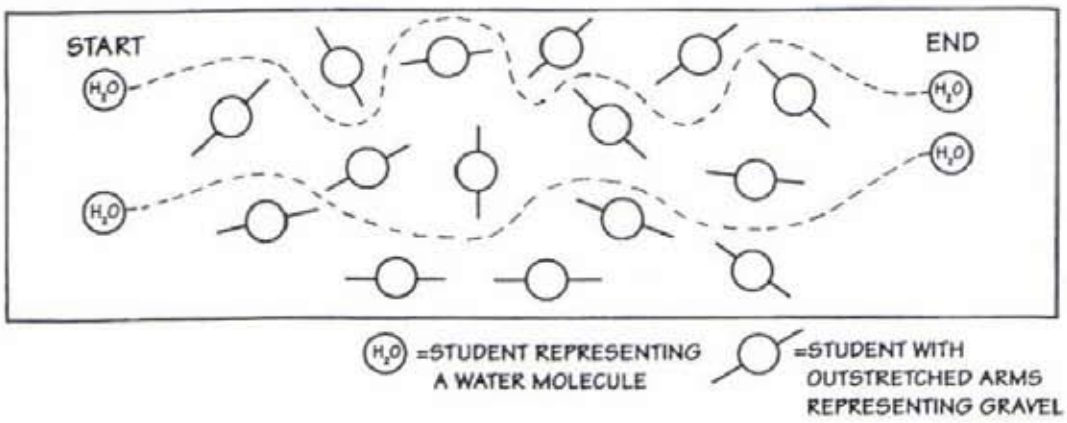
Making connections to our Ground Waters, Seeing it move through different soil types.

1. Cut the top off the soda bottles (to the rounded part) and punch a hole through the bottom with the sharp end of scissors (about the size of a dime).
2. Fill three of the bottles with gravel, sand, or clay. In the fourth bottle securely tape a layer of plastic to the bottom of the bottle. Have a partner slowly pour water over the underground rock formations or impermeable surface.
3. Observe how fast or slow the water moves through each container and then discuss the results. Which container emptied the fastest, the slowest? How would the different materials influence water movement in natural systems. Which material most closely resembles the geology of your watershed?

Some fun activities to do as a large group to further represent underground rock formations…

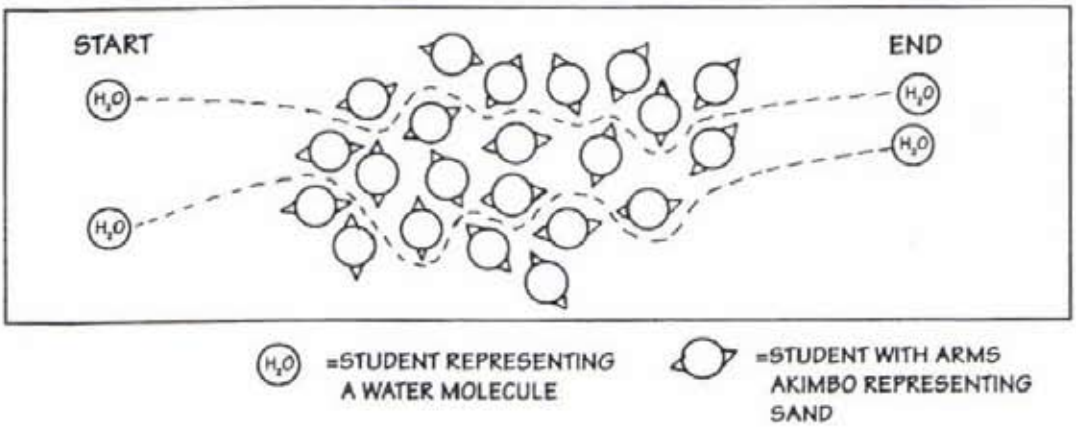
A

WATER MOVEMENT THROUGH GRAVEL



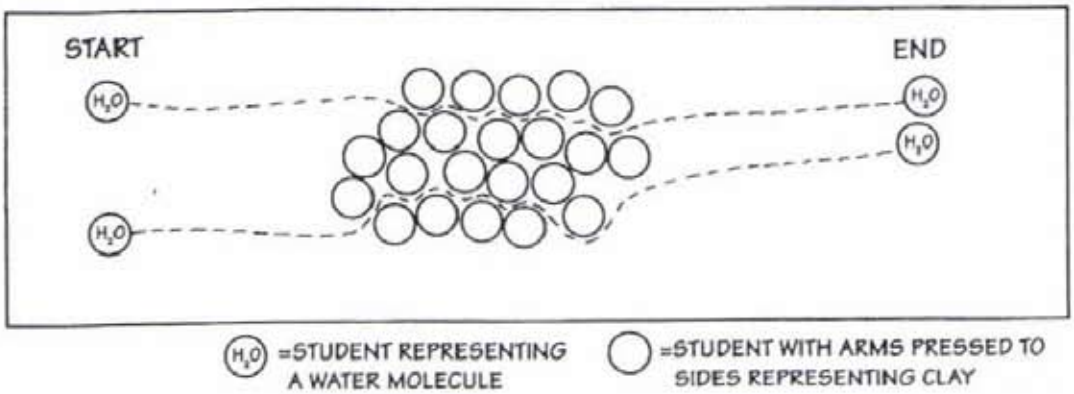
B

WATER MOVEMENT THROUGH SAND



C

WATER MOVEMENT THROUGH CLAY



Water Wonders

(Adapted from Project Learning Tree Environmental Education Activity Guide)

Main Focus: Water
Benchmarks:

Approximate time: ?? mins.

Sometimes we forget that the earth has only a fixed amount of water. It doesn't come from an endless supply in the clouds, water moves through a cycle. In this activity, students learn the basics about the water cycle and the different paths a water molecule might take. They also learn the role that plants and animals play in the water cycle. This activity provides an opportunity for science and English departments to work together since it includes an examination of the water cycle and a creative writing component.

COMMON CURRICULUM GOALS AND BENCHMARKS

The Water Wonders activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

???

GOALS AND OBJECTIVES

Students will:
???

MATERIALS

- Strips cut from activity prompts
- Scorecard for each student
- Seven envelopes labeled for each of the seven stations
- Watch or stopwatch

PREPARATION

1. Photocopy Scorecard and Activity Prompts. Cut prompts into strips.

2. Label an envelope for each station: Cloud, Mountain, Stream, Groundwater, Ocean, Plant, and Animal.

3. Put prompts in the appropriate envelope and place them around the room to form different stations.

PROCEDURE

1. Ask the students a few pre-activity questions to establish a general idea of the water cycle.
   a. If every living thing needs water, why isn't the water dried up?
   b. What is a cycle?
   c. What are some words they associate with the water cycle (transpiration, evaporation, precipitation…)?
   d. Where does water go when a puddle dries up?

2. Draw a sketch of the water cycle on the chalkboard.
   a. Does water always follow the same path as in the sketch?

3. Divide the class into 7 groups. Each group should have a scorecard. Explain that each individual represents a water molecule. Each group begins at a different station. They will follow the prompts that they draw to determine their own journey through the water cycle. Students should have just enough time to draw a new prompt and write down the following information on their score card: What station are they at? Where are they going next? What happens to create this change? When the teacher yells "Cycle!" they move on to the next station. Repeat this until students have cycled through the cloud station a couple times.

4. Ask the students to go back to their seats and write a brief story of their journey as a water molecule.

5. Write the names of the seven stations on the chalkboard. Have students share the different ways they moved to each station.

6. Discuss the following questions.

QUESTIONS

1. Even though different water molecules took different paths was their something similar about the journey's they took?
2. Which stations were visited the most? What can we infer from this?
3. Can you name any other parts of the water cycle that were not represented in these stations? Where might they be included in the cycle?
4. What makes water move through the cycle? What would happen if the sun's energy were blocked from the earth? What if the water stayed in the oceans or the clouds?
5. How is the water cycle important to plants and animals?

Water Cycle Score Card

Name_____

Station Stop	*What Happens*	*Destination*
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

ACTIVITY PROMPTS

Station 1 CLOUD

You fall as rain onto a mountain. Go to Mountain.
You fall as snow onto a mountain. Go to Mountain.
You fall as rain onto a stream. Go to Stream.
You fall as rain onto an ocean. Go to Ocean.
You fall as rain onto a parking lot. Go to Stream.
You fall as rain onto a parking lot. Go to Stream.

Station 2 MOUNTAIN

You evaporate into the air. Go to Cloud.
You soak into the ground and are absorbed by a plants root. Go to Plant.
You soak into the ground and become part of the groundwater. Go to groundwater.
You roll down hill and become part of a stream. Go to stream.
You get frozen in ice and stay their. Stay at Mountian.

Station 3 OCEAN

You are one of countless molecules in the ocean. Stay there.
You are one of countless molecules in the ocean. Stay there.
You evaporate into air. Go to Cloud.
You evaporate into air. Go to Cloud.
A kelp plant takes you in, releases you through it's leaf and transpires you into the air. Go to Cloud.
Go to plant but do not draw a card. Then go directly to cloud.

Station 4 STREAM

You evaporate into air. Go to Cloud.

You evaporate into air. Go to Cloud.
An animal comes to the stream and licks you up. Go to animal.
You continue rolling downhill and become part of the ocean. Go to Ocean.
You continue rolling downhill and become part of ocean. Go to Ocean.

Station 5 GROUNDWATER

You become part of an underground stream that flows to an ocean. Go to Ocean.
You become part of an underground stream that flows to an ocean. Go to Ocean.
You become part of an underground stream that flows to a Spring. Go to Stream.
You become part of an underground stream that flows to a Spring. Go to Stream.
A plant takes you in through its roots. Go to Plant.
You are pumped out of the ground from a well to irrigate a farm. Go to Plant.

Station 6 ANIMAL

After using you to process food, an animal urinates and you end up on the ground. Go to Mountain.
After using you to process food, an animal urinates and you end up on the ground. Go to Mountain.
You are exhaled from a human’s lungs into the air as vapor. Go to Cloud.
You are exhaled from a human’s lungs into the air as vapor. Go to Cloud.
A person uses you for brushing her/his teeth. Go to stream.

Station 7 PLANT

The plant transpires you through its leaves into the air as Vapor. Go to Cloud.
The plant transpires you through its leaves and you evaporate. Go to Cloud.
The plant transpires you through its leaves and you evaporate. Go to Cloud.
The plant uses you to grow. Stay at plant.
The plant stores you in its edible fruit. Go to Animal.

Ecology

- Brainstorm with your students: what types of plants, animals and bugs live in your watershed?
- Are they different from other regions?
- Make some guesses and have your students research to find out

ONE DAY OUTSIDE

- Spend a day outside with your students
- Touch, smell and have your students use journals for recording observations and drawing pictures.
- Practice sensory observation (Project WET, "Stream Sense" p.195)

ADDITIONAL ACTIVITIES

- WebQuests – find and create on-line activities for identifying trees, plants, and animals. Have students discover answers for themselves and discuss in class. (Hometown Waters pg. WQ3)
- Powerpoint Presentation – create or have students create presentations about regional wildlife and plant life.
- Invertebrate Collection - Dig holes in spots around your watershed (schoolyard, home yard, forest, near creek). Plant cups in the holes to collect bugs. Identify your specimens! (Check out: http://caplter.asu.edu/explorers/protocol/arthropods/arthro.htm

LOCAL CONTACT

Name				
Organization/Affiliation				
Address				
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Email				
Type of Activity/Program				
Description				
Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

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Journal Making!!

Main Focus: Eco-Art
Benchmarks:

Approximate time: 30 mins.

This activity helps students make a connection with the natural world. Through this journaling activity students have an opportunity to make this a meaningful and a fun learning experience.

COMMON CURRICULUM GOALS AND BENCHMARKS

The Snow Way activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

The Arts – Apply ideas, techniques and processes in the arts.

GOALS AND OBJECTIVES

Students will:

- Be able to create a nature journal will be used for observing outside, drawing, homework assignments, and writing down thoughts or ideas.

MATERIALS

- Cut up paper bags (cut into squares)
- Cut up white paper for inside of journals (squares a little smaller than paper bag squares).
- Twine or yarn
- Colored pencils and magic markers
- Glue Stick
- Hole punch
- Rubber bands
- An assortment of leaves and needles

PROCEDURE

Creating your very own journal

1. Tell the students that they may only use the materials that are listed above and no others. Nothing from their desks or other art from the supply cupboard.

2. The challenge is to get the students to use only these materials to create a journal that they may use throughout the remainder of the Hometown Waters unit.

3. They may decorate it any way they like, but be sure they conserve so that others may use the materials in demand.

4. The journal must be sturdy enough to hold up for a week or two and will be taken outside.

Local Partners

IDENTIFYING AND BECOMING FAMILIAR WITH LOCAL PARTNERS

- "What's Happening?" (Project WET pg.425)
- "Humpty Dumpty" (Hometown Waters pg.LP5)
- Invite community members to your class to give presentations about local restoration projects
- Have your students find out about community organizations and events they can get involved with
- Have your class develop a plan of action for getting involved in the community
- Writing – have students write in journals or for *HWI* publications and local newspapers about how they are contributing to the health of their watershed
- Finish Watershed Inventory
- "Dilemma Derby" (Project WET pg.377)
- Watershed Wheel – kids can create their own watershed - ART http://natsci.edgewood.edu/wingra/watershed/watershed_wheel.htm
- Contact your local watershed council

LOCAL CONTACT

Name				
Organization/Affiliation				
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Where (circle)	In-class	Schoolyard	Outdoor Field Trip	Indoor Field Trip

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Humpty Dumpty

(What would Humpty Dumpty have looked like if they could have put him back together again?)

Main Focus: Local Partners
Benchmarks:

Approximate time: 50 mins.

This activity creates a connection for the students as they relate the challenges of doing environmental restoration projects to piecing together a simple puzzle. Some of you may have tinkered with an old clock or a radio, taking it apart and realizing that it is much more difficult putting it back together. Just like some puzzles that students have taken part with, which tend to be more difficult than thought to be.

COMMON CURRICULUM GOALS AND BENCHMARKS

The Humpty Dumpty activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

Geography – Understand and use geographic skills and concepts to interpret contemporary and historical issues.

Earth and Space Science – Understand physical properties of the Earth and how those properties change.

Science Inquiry – Use interrelated processes to pose questions and investigate the physical and living world.

GOALS AND OBJECTIVES

Students will:

- Be able to describe the challenges of restoring an altered natural environment
- Be able to develop a restoration plan for a local site.
- Be able to name three components of a watershed unit

MATERIALS

- Photos of altered sites
- Object with multiple parts (e.g. an old radio)
- Old magazines
- Glue
- Scissors
- Ruler
- Drawing materials
- Poster board

PROCEDURE

1. Divide up into small groups of 4-5 students and have each group with a puzzle pattern. Have the groups glue the pattern (face-up) onto the poster-board and cut around the circle. Distribute old magazines and have students locate nature scenes, preferably ones containing water. Have the students cut out a picture and glue it to the poster-board side. An alternative is to have the students draw a picture of an ecosystem on the poster-board.

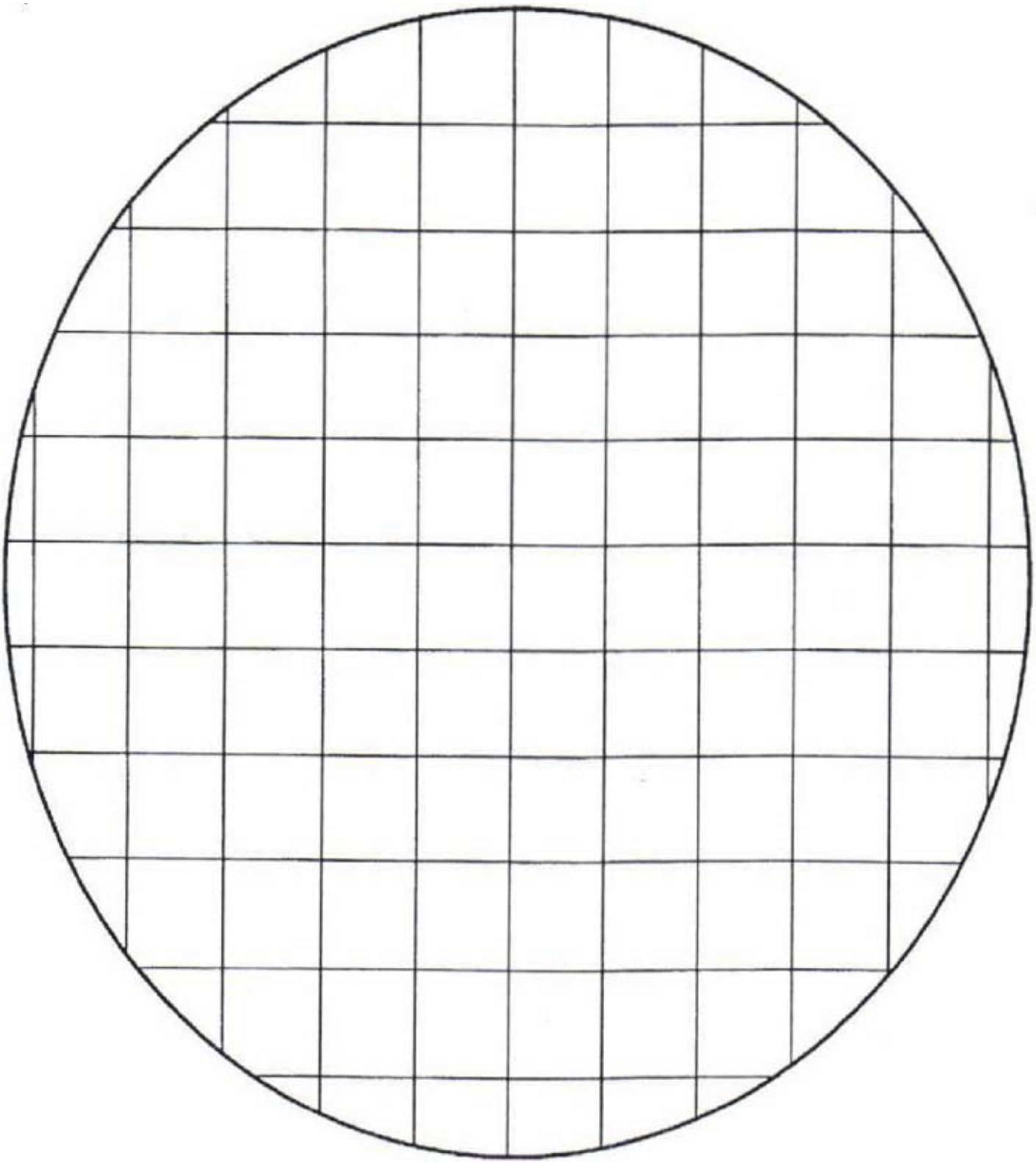
2. Have the students carefully cut the poster-board on the lines of the pattern.

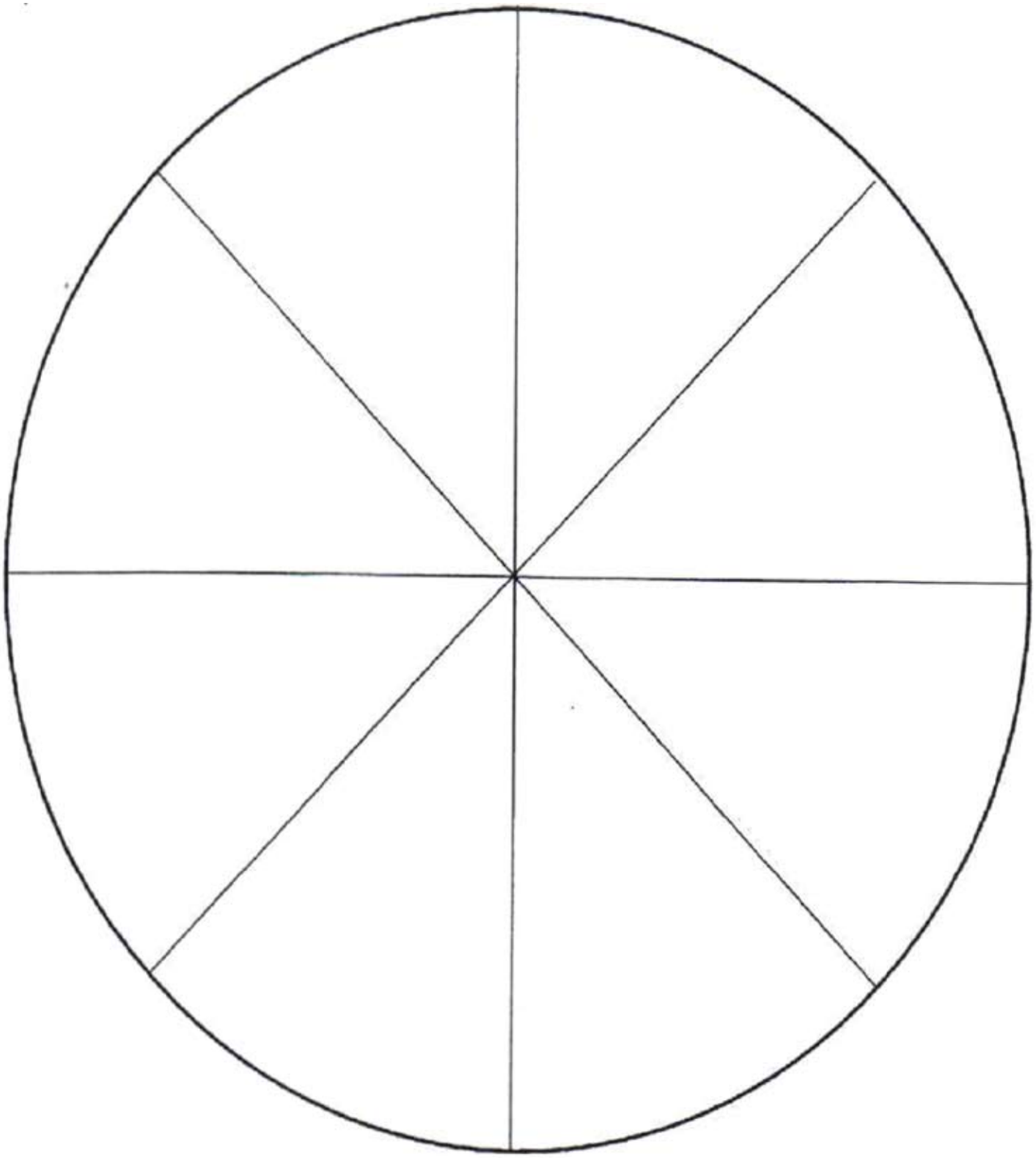
3. Instruct students to scatter the pieces on their desk top. Explain that this represents a natural area that has been altered.

4. Discuss the complications of putting ecosystems back together again.

5. Have the students arrange their pieces so the cut up picture is facedown. Have them switch places with another group. Without turning the pieces over, the groups should try to put the puzzles together again.

6. Have groups tape the puzzles together and turn the puzzles over. Some of the pictures may be accurately reconstructed, but because of pairs of mirror images that can be interchanged (without the visual clue of a picture to guide students), some may not. This emphasizes the point that the parts of a system must fit together properly, and that incomplete knowledge of the parts can complicate its restoration. (Even if the puzzle has been put together properly, it is still different from the original because it has been cut apart).





WebQuest

A WebQuest is an inquiry-oriented lesson format in which most or all of the information that learners work with comes from the web. WebQuests provide specific websites for students to explore in order to find the information they need to answer a question.

WebQuests are one more resource for teachers to use in getting their students involved in answering realistic questions about the health and local issues of their watershed. A WebQuest is also an opportunity for teachers to include technology as they are integrating regional watershed education into their curriculum.

AN EXAMPLE WEBQUEST

Students might explore the impacts of dams on rivers, specifically dams on the river in their basin.

The quest may ask students to address the following questions:

1. Do the benefits of dams outweigh the ecological costs?
2. Do the ecological costs outweigh the benefits?

Students would be split into groups to examine the issue. Topics for investigation might include fish passage, upstream effects, downstream effects, cultural effects, benefits and reasons for the dam.

Each student is responsible for exploring their assigned topic from a given vantage point. A student might assume the role of a "Fish Biologist" and be responsible for researching their topic from that perspective. Additionally one student might examine the issue from the perspective of a farmer or a rancher. WebQuests provide specific websites to explore in order to find information.

Visit *HWI*'s website for more examples of WebQuests. If you create your own WebQuest please let us know!

WebQuest

Main Focus: WebQuest
Benchmarks:

Approximate time: Varies (from 2-8 class sessions)

Webquest can be a tool to be used any time during Hometown Waters. It is a research tool for topics that we are teaching. For example stream hydrology, and how it affects the flow of Johnson Creek.

COMMON CURRICULUM GOALS AND BENCHMARKS

The WebQuest activity can help teachers meet Oregon Department of Education common curriculum goals and benchmarks for middle school within the following areas:

Geography – Understand and use geographic skills and concepts to interpret contemporary and historical issues.

History – Relate significant events and eras in United States and world history to past and present issues and developments.

Social Science Analysis – Design and implement strategies to analyze issues, explain perspectives, and resolve issues using the social sciences.

Earth and Space Science – Understand physical properties of the Earth, how those properties change, and the Earth's relationship to other celestial bodies.

Science Inquiry – Use interrelated processes to pose questions and investigate the physical and living world.

GOALS AND OBJECTIVES

Students will:

- Be able to verbally describe the beneficial (both current and historical) factors of having Johnson Creek flow through the Portland area.
- Be able to verbally describe the health of the Johnson Creek Watershed.
- Be able to understand and discuss the threats that are currently threatening Johnson Creek and Watershed.

MATERIALS

- Computer
- Johnson Creek Watershed Information (see page RWI3-RWI9)

PROCEDURE

Investigating your watershed

In teams or individually, you will investigate the watershed of Johnson Creek. During your travels you will collect data about the importance, health, threats and the restoration efforts that are in place along this urban stream.

1. Why is Johnson Creek important and how does it affect the communities it passes through?
    a. Historically
    b. Economically (i.e. fisheries, drinking water, irrigation, power generation)
    c. Ecologically
    d. Recreationally
2. How healthy is the Johnson Creek today and why?
    a. Fish habitat
    b. Riparian
    c. Recreationally
3. What are the largest threats to health of Johnson Creek today?

WEB RESOURCES

1. Johnson Creek Watershed Council (Excellent resources!)
   www.jcwc.org
2. Bureau of Environmental Services
   www.portlandonline.com/bes
3. Oregon Environmental Council
   www.oeconline.org
4. Science In Your State: USGS
   http://www.usbr.gov/pn/
5. Oregon Water Resource Department
   http://egov.oregon.gov/OWRD/

What other resources did you find?

1.

2.

3.

4.

5.

6.

Service Learning / Extended Application

Since its launch in 2005, *HWI* has witnessed engaged students assuming responsibility for the health of their watersheds through valuable stewardship projects. Projects large and small have a remarkable impact on students, giving them a profound sense of place. Though many of these efforts have revolved around inquiry-based science, it is important to note that the opportunities *HWI* seeks to encourage are by no means bound by explorations in science.

The natural world provides one of the most dynamic contexts for learning and allows students to discover the complex interactions and relationships found in every ecosystem. Recognizing the interconnectedness of these systems opens the door for limitless interpretation and expression of ideas. It is a living, breathing system full of opportunities to be awed, humbled and inspired by. The scope of projects in which students participate should, and currently do, reflect a multi-disciplinary approach in communicating our relationship to the natural world. Some students are inspired to capture the colors and textures of nature through photography and art while others are inspired to conduct research and expand their understanding of what they see.

Service Learning and Extended Applications provide students with the opportunity to become truly engaged in the maintenance and preservation of their local watershed. Students should be supported and encouraged in developing their own ideas for projects based on the information they learn through HW. Project ideas should address local issues related to watershed health.

In Service Learning and Extended Applications, students apply and extend their knowledge in new and complex situations related to their personal and career interests and post high school goals. Students extend prior knowledge through critical thinking, problem solving or inquiry in real world context.

Participation in projects offers students opportunities for:

- Enhanced awareness of their local watershed
- Connections to community organizations and partners
- Public speaking occasions
- Career related learning experience
- Recognition for the merit of their work

Qualifying experiences generally:

- Support the educational goals of the school district
- Contextualize learning
- Connect students to the community
- Promote citizenship
- Prepare students for transitions beyond high school
- Benefit all partners involved, help to meet a community need

Corvallis School District has developed tools to help teachers and students track Service Learning and Extended Learning Projects.

There resources are available on the Corvallis SD Web site:

http://www.csd509j.net/district_information/departments_and_services/extended_learning/service%20learning.html

Projects may satisfy graduation requirements for "Essential Skills" including:

- Speak and present publicly
- Applying mathematics in a variety of settings
- Using technology
- Think critically and analytically (including scientific inquiry, problem solving)

- Demonstrate civic and community engagement
- Demonstrate global literacy
- Demonstrate career related learning, personal management, teamwork, employment foundations, career development

Collections of evidence should document a student's participation in Service Learning and Extended Applications. Collections may include, but are not limited to:

- Documentation of learning through a career related learning experience
- Projects related to school, student organization, or workplace activities
- Community-based projects related to a community problem or need
- Certificate of Initial Mastery (CIM) work samples
- Research or technical reports
- Storyboards
- Artwork
- Video or audio presentations
- PowerPoint displays
- Photo collections
- CD-ROMs with multimedia presentations
- Reflection pieces
- Journals
- Internship logs
- Job shadow notebooks

Projects can range from scientific investigations to creative arts explorations. The following are examples of student projects:

1. A Day in the Life of the Columbia Pacific: several partners in 1999 pulled this project together. It included about 75 high school students from 6 different high schools being taught by local photojournalists. Students all went out on one day and took photos in these categories: 1) arts and communications; 2) business; 3) infrastructure; 4) health, safety and recreation; 5) human resources; and 6) natural resource systems. Best photos were published with help from a grant and the local newspaper in an insert.

2. Marking Our Place: Susan Cross, Bear Creek Regional Education Coordinator for *HWI* in 2005, coordinated this project. It was mostly adults with a few youth participants. It was designed to build community between naturalists and artists and to also grow a body of art and literature about the Klamath-Siskiyou. Susan matched up teams of 3 artists or writers with a naturalist and sent them out to either urban, rural, or wilderness places for a long day. The participants then were required to create some art or writing that came out of the experience.

3. State of the Watershed Reports: These were done by a number of different school groups in the late 1990's. Peter Hayes, former *HWI* director conducted one with his students in the Thornton Creek Watershed in Washington. Students went out to different locations in their watershed to collect the same data sets on the same day. The product is a snapshot of watershed health on one day in several locations. Kids might collect WQ data, EPA Streamwalk style data, and state of litter or vandalism or macroinvertebrate populations. It would be best to collect the same sets of data so kids can compare apples and apples.

TRACKING & EVALUATION

We've included a set of tools to be used for tracking and evaluating student projects. The information obtained from your students can be used to document graduation requirements or held for personal records. We encourage the use of the *HWI* tools in order to provide *HWI* with the opportunity to share the work of your students with their peers. Students throughout the state are engaging in meaningful projects and deserve recognition for the merit of their work.

Healthy Waters Institute®

INDEPENDENT/SERVICE LEARNING PROJECT

Oregon Trout

Please use this document to report independent project activity. This information will be used for tracking and evaluation purposes and may be shared as part of on-going assessment of HWI.

Date _____ Name of person reporting _____

Project Information

School _____

Address _____

_____

Teacher _____

Grade _____

# of Students _____

Total # of Hours with Students _____

Student Names

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

Partners _____

_____

_____

Project Dates _____

Description _____

_____

_____

_____

_____

_____

List supporting curriculum programs or activities (ie. Salmon Watch, 1000 Drops, etc.)

_____

_____

_____

How useful was the curriculum in planning, implementing and evaluating the project?

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

Please report on the following if applicable to project:

_____ # stream miles worked on by students (in linear feet)

_____ # native plants planted

_____ # invasive plants removed

_____ # bags of trash collected

List any indicator, threatened or endangered species involved: _____

_____

_____

Please check all of the following skills that apply to this project:

☐ Reading
☐ Writing
☐ Speaking and presenting publicly
☐ Applying mathematics
☐ Using technology
☐ Thinking critically and analytically (scientific inquiry, problem solving)
☐ Demonstrating civic and community engagement
☐ Demonstrating career related learning
☐ Service learning

Did students have an opportunity to earn proficiency credit? (Please circle one) YES NO

Was an education grant awarded for this project? YES NO

If YES,

Was a summary submitted with photos or products? YES NO

Project Outcome _____

_____

_____

_____

_____

Additional Comments _____

_____

_____

_____

_____

_____

_____

Please return completed forms to:

OREGON TROUT
HEALTHY WATERS INSTITUTE
65 SW YAMHILL, SUITE 300
PORTLAND, OREGON 97204

Fax (503) 222-9187

Healthy Waters Institute®

STUDENT SURVEY (PRE-PARTICIPATION)

Oregon Trout

Name _____ Grade _____

School _____ Date _____

Email _____ Program or Project _____

Please circle the number that best describes what you think:

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1. I enjoy learning about the natural environment.	1	2	3	4	5
2. I am more interested in other things than nature.	1	2	3	4	5
3. I like talking with other people about environmental issues.	1	2	3	4	5
4. I am concerned about environmental problems and issues.	1	2	3	4	5
5. I am not interested in learning more about nature.	1	2	3	4	5
6. I value/appreciate the natural environment.	1	2	3	4	5
7. I would rather spend my time inside than in nature.	1	2	3	4	5
8. I don't care about issues affecting my local environment.	1	2	3	4	5
9. I think humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
10. I believe humans must live in harmony with nature in order to survive.	1	2	3	4	5
11. I think conserving natural resources is unnecessary.	1	2	3	4	5
12. I believe humans have a responsibility to solve environmental problems.	1	2	3	4	5
13. I believe that I have a personal responsibility to help the environment.	1	2	3	4	5
14. One person can't really do anything to help the environment.	1	2	3	4	5

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
15. I am not interested in volunteering to care for the environment by planting trees, trash clean-ups, etc.	1	2	3	4	5
16. I would like to spend more time learning outside during school.	1	2	3	4	5
17. I conserve water at home.	1	2	3	4	5
18. I write letters to politicians about environmental issues.	1	2	3	4	5
19. I have had an internship/job with a watershed council, as a field scientist (hydrologist, botanist, etc), in stream and river restoration or with another natural resource organization.	1	2	3	4	5

Please use the following space to draw a picture of a healthy watershed or natural environment:

Healthy Waters Institute®

STUDENT SURVEY (POST-PARTICIPATION)

Oregon Trout

Name _____ Grade _____

School _____ Date _____

Email _____ Program or Project _____

Please circle the number that best describes what you think:	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1. I enjoy learning about the natural environment.	1	2	3	4	5
2. I am more interested in other things than nature.	1	2	3	4	5
3. I like talking with other people about environmental issues.	1	2	3	4	5
4. I am concerned about environmental problems and issues.	1	2	3	4	5
5. I am not interested in learning more about nature.	1	2	3	4	5
6. I value/appreciate the natural environment.	1	2	3	4	5
7. I would rather spend my time inside than in nature.	1	2	3	4	5
8. I don't care about issues affecting my local environment.	1	2	3	4	5
9. I think humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
10. I believe humans must live in harmony with nature in order to survive.	1	2	3	4	5
11. I think conserving natural resources is unnecessary.	1	2	3	4	5
12. I believe humans have a responsibility to solve environmental problems.	1	2	3	4	5
13. I believe that I have a personal responsibility to help the environment.	1	2	3	4	5
14. One person can't really do anything to help the environment.	1	2	3	4	5
15. I am not interested in volunteering to care for the environment by planting trees, trash clean-ups, etc.	1	2	3	4	5
16. I would like to spend more time learning outside during school.	1	2	3	4	5

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
17. I will conserve water at home.	1	2	3	4	5
18. I will write letters to politicians about environmental issues.	1	2	3	4	5
19. I would like to find an internship/job with a watershed council, as a field scientist (hydrologist, botanist, etc), in stream and river restoration or with another natural resource organization.	1	2	3	4	5

Is there anything you will do differently because of this program? _____

_____

_____

_____

Do you think this experience will impact your choices for college or career? How? _____

_____

_____

_____

Why are healthy watersheds or natural environments important? _____

_____

_____

_____

What is the one thing from this experience you will remember? _____

_____

_____

_____

Please use the following space to draw a picture of a healthy watershed or natural environment:

PRE-PROJECT TEACHER WORKSHEET: SERVICE-LEARNING

Project Title: _____

Teacher: _____ Ph. #_____ Planned Start Date: _____

School: _____ Planned End Date: _____

Course Area/Title: _____

This worksheet is designed to help you develop a project for your class that links community service to the course curriculum, fulfilling the Extended Student Learning Through Service-Learning component of the graduation requirements. Please review the Developing Ideas for Service-Learning and Post-Project Report sheets for additional ideas and guidelines.

Community Benefit/Benefactors (What will the service be? Who will be served?):

Curriculum Connection (How will the project be linked to in-class curriculum?):

*The process of Service-Learning includes four essential stages. Please check the **PARC/D** elements that will be included in your project:*

Preparation

- ☐ Student-generated project ideas
- ☐ Student planning (time schedules, budgeting, materials, tools, etc)
- ☐ Research
- ☐ Brainstorming possible partners/resources

Action

- ☐ Contacting partners
- ☐ Surveys
- ☐ Interviews
- ☐ Off-campus service
- ☐ Conducting experiments
- ☐ Collecting data

Reflection

- ☐ Journaling/Reflection
- ☐ Assessing outcome of project

Celebration/Demonstration

- ☐ Presenting the project (oral report, visual display, etc.)
- ☐ Final class discussion or wrap-up session

Your Service-Learning project can and should qualify as meeting the Career-Related Learning Standards (CRLS) and Civic Standards. Reviewing these requirements can also help with brainstorming ideas. Please mark the components that you plan to incorporate into your project.

CRLS

- ☐ *Personal Management (PM)*
  - ☐ CS.PM.01: Identified tasks to be completed and initiated necessary action
  - ☐ CS.PM.02: Planned, organized and completed projects on time and met quality standards
  - ☐ CS.PM.03: Took responsibility for decisions and actions and anticipated the consequences
  - ☐ CS.PM.04: Maintained regular and punctual attendance
  - ☐ CS.PM.05: Maintained appropriate interactions with colleagues

- ☐ *Problem Solving (PS)*
  - ☐ CS.PS.01: Identified problems and located information that would lead to solutions
  - ☐ CS.PS.02: Identified alternatives to assist in problem solving
  - ☐ CS.PS.03: Assessed the consequences of the alternatives
  - ☐ CS.PS.04: Selected and explained a proposed solution and course of action
  - ☐ CS.PS.05: Developed a plan to implement the selected course of action
  - ☐ CS.PS.06: Assessed results and took corrective action

- ☐ *Communication (CM)*
  - ☐ CS.CM.01: Located, processed and conveyed information using traditional and technological tools
  - ☐ CS.CM.02: Listened to and summarized key elements of verbal and non-verbal communication
  - ☐ CS.CM.03: Gave and received feedback in a positive manner
  - ☐ CS.CM.04: Read technical/instructional materials for information and applied to tasks
  - ☐ CS.CM.05: Wrote instructions, technical reports, and business communications clearly and accurately
  - ☐ CS.CM.06: Spoke clearly, accurately, and appropriately when giving oral instructions, technical reports and business communications

- ☐ *Teamwork (TW)*
  - ☐ CS.TW.01: Identified teams and roles within teams; described importance of roles
  - ☐ CS.TW.02: Demonstrated skills that improve team effectiveness (e.g., negotiation, compromise, conflict management, shared decision-making)

- ☐ *Employment Foundations (EF)*
  - ☐ CS.EF.01: Applied academic knowledge and technical skills in a career context
  - ☐ CS.EF.02: Selected, applied and maintained tools and technologies appropriate for the workplace
  - ☐ CS.EF.03: Identified parts of organizations and systems and how they fit together
  - ☐ CS.EF.04: Described how work moves through a system
  - ☐ CS.EF.05: Described the changing nature of work, workplaces and work processes on individuals, organizations and systems
  - ☐ CS.EF.06: Demonstrated appropriate dress, appearance and personal hygiene
  - ☐ CS.EF.07: Explained and followed health and safety practices
  - ☐ CS.EF. 08: Explained and followed regulatory requirements, security procedures and ethical practices

☐ *Career Development (CD)*

- ☐ CS.CD.01: Assessed personal characteristics related to educational and career goals
- ☐ CS.CD.02: Researched and analyzed career and educational information related to project
- ☐ CS.CD.03: Developed and discussed a plan designed to achieve personal, educational and career goals
- ☐ CS.CD.04: Monitored and evaluated educational and career goals
- ☐ CS.CD.05: Demonstrated job-seeking skills (e.g., writing resumes, completing applications and participating in interviews)

CIVIC STANDARDS

- ☐ Understand rights and responsibilities of citizens
- ☐ Understand that limited resources make economic choices necessary
- ☐ Design and implement strategies to analyze issues, explain perspectives and resolve issues
- ☐ Other, please explain _____

There are four methods of conducting Service-Learning. Once your project design is decided, you should be able to categorize it as one or more of the following:

1. **Direct:** Students' service directly affects and involves the recipients (e.g., tutoring, animal care, working w/ elderly).
2. **Indirect:** Activities do not directly impact individuals, but benefit the community as a whole (e.g., restoring wetlands, painting park benches, stocking food pantries, collecting books for kids).
3. **Advocacy:** The intent is to create awareness of or promote action on an issue of public interest (e.g., writing to government leaders, holding a town meeting, performing a play).
4. **Research:** Students find, gather and report information in the public interest (e.g., developing surveys, conduct formal studies, evaluations, experiments or interviews)

Please describe your project and action plan:

POST-PROJECT TEACHER REPORT: SERVICE-LEARNING

Project Title: _____

Teacher: _____ Ph. #_____ Start Date: _____

School: _____ End Date: _____

Course Area/Title: _____

Service Site: ☐ School Site ☐ Other _____

Please provide a brief description of your project:

A) # of students participating _____ students

B) # of student classroom hours per student _____ avg. hrs/student
(Include project selection, planning, reflection and celebration time)

C) # of student non-classroom hours _____ avg. hrs/student
(Include only hours spent as a class)

D) Total # of Project Hours **_____ total hours**
(Line A) x (Line B + Line C) = Line D

E) # of Adult Volunteers _____ adults
(Include Partners, Parents, AmeriCorps Members, etc)

F) # of Adult Volunteer hours _____ avg. hours/adult

COMMUNITY PROJECT PARTNER(S) **PHONE #**

_____ _____

_____ _____

PLEASE LIST COMMUNITY RESOURCES (ESTIMATED $)

Materials _____

Grants _____ Total $_____

Donors _____

Please mark the Career-Related Learning Standards and Civic Standards met by your project.

CRLS

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CIVIC STANDARDS

- [ ] Understand rights and responsibilities of citizens
- [ ] Understand that limited resources make economic choices necessary
- [ ] Design and implement strategies to analyze issues, explain perspectives and resolve issues
- [ ] Other, please explain _____

PRE-PROJECT STUDENT WORKSHEET: SERVICE-LEARNING

Name: _____

Project Title: _____

Teacher: _____ Ph. #_____ Planned Start Date: _____

School: _____ Planned End Date: _____

Course Area/Title: _____

This worksheet is designed to help you develop a project with your classmates and instructor that links community service to the course curriculum, fulfilling the Extended Student Learning Through Service-Learning component of the graduation requirements. Please review the Post-Project Report for additional ideas and guidelines.

Community Benefit/Benefactors (What will the service be? Who will be served?):

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Action

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Reflection

- ☐ Journaling/Reflection
- ☐ Assessing outcome of project

Celebration/Demonstration

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  - ☐ CS.EF.01: Applied academic knowledge and technical skills in a career context
  - ☐ CS.EF.02: Selected, applied and maintained tools and technologies appropriate for the workplace
  - ☐ CS.EF.03: Identified parts of organizations and systems and how they fit together
  - ☐ CS.EF.04: Described how work moves through a system
  - ☐ CS.EF.05: Described the changing nature of work, workplaces and work processes on individuals, organizations and systems
  - ☐ CS.EF.06: Demonstrated appropriate dress, appearance and personal hygiene
  - ☐ CS.EF.07: Explained and followed health and safety practices
  - ☐ CS.EF. 08: Explained and followed regulatory requirements, security procedures and ethical practices

☐ *Career Development (CD)*

- ☐ CS.CD.01: Assessed personal characteristics related to educational and career goals
- ☐ CS.CD.02: Researched and analyzed career and educational information related to project
- ☐ CS.CD.03: Developed and discussed a plan designed to achieve personal, educational and career goals
- ☐ CS.CD.04: Monitored and evaluated educational and career goals
- ☐ CS.CD.05: Demonstrated job-seeking skills (e.g., writing resumes, completing applications and participating in interviews)

CIVIC STANDARDS

- ☐ Understand rights and responsibilities of citizens
- ☐ Understand that limited resources make economic choices necessary
- ☐ Design and implement strategies to analyze issues, explain perspectives and resolve issues
- ☐ Other, please explain _____

There are four methods of conducting Service-Learning. Once your project design is decided, you should be able to categorize it as one or more of the following:

1. **Direct:** Students' service directly affects and involves the recipients (e.g., tutoring, animal care, working w/ elderly).
2. **Indirect:** Activities do not directly impact individuals, but benefit the community as a whole (e.g., restoring wetlands, painting park benches, stocking food pantries, collecting books for kids).
3. **Advocacy:** The intent is to create awareness of or promote action on an issue of public interest (e.g., writing to government leaders, holding a town meeting, performing a play).
4. **Research:** Students find, gather and report information in the public interest (e.g., developing surveys, conduct formal studies, evaluations, experiments or interviews)

Please describe your project and action plan:

POST-PROJECT STUDENT REPORT: SERVICE-LEARNING

Name: _____

Project Title: _____

Teacher: _____ Ph. #_____ Start Date: _____

School: _____ End Date: _____

Course Area/Title: _____

Service Site: ☐ School Site ☐ Other _____

Please provide a brief description of your project:

A) # of students participating _____ students

B) # of student classroom hours per student _____ avg. hrs/student
(Include project selection, planning, reflection and celebration time)

C) # of student non-classroom hours _____ avg. hrs/student
(Include only hours spent as a class)

D) My Total Project Hours **_____ total hours**
(Line B + Line C) = Line D

E) # of Adult Volunteers _____ adults
(Include Partners, Parents, AmeriCorps Members, etc)

F) # of Adult Volunteer hours _____ avg. hours/adult

Community Project Partner(s)	**Phone #**
_____	_____
_____	_____

Please list community resources (estimated $)

Materials _____

Grants _____ Total $_____

Donors _____

Please mark the Career-Related Learning Standards and Civic Standards met by your project.

CRLS

- [ ] *Personal Management (PM)*
  - [ ] CS.PM.01: Identified tasks to be completed and initiated necessary action
  - [ ] CS.PM.02: Planned, organized and completed projects on time and met quality standards
  - [ ] CS.PM.03: Took responsibility for decisions and actions and anticipated the consequences
  - [ ] CS.PM.04: Maintained regular and punctual attendance
  - [ ] CS.PM.05: Maintained appropriate interactions with colleagues

- [ ] *Problem Solving (PS)*
  - [ ] CS.PS.01: Identified problems and located information that would lead to solutions
  - [ ] CS.PS.02: Identified alternatives to assist in problem solving
  - [ ] CS.PS.03: Assessed the consequences of the alternatives
  - [ ] CS.PS.04: Selected and explained a proposed solution and course of action
  - [ ] CS.PS.05: Developed a plan to implement the selected course of action
  - [ ] CS.PS.06: Assessed results and took corrective action

- [ ] *Communication (CM)*
  - [ ] CS.CM.01: Located, processed and conveyed information using traditional and technological tools
  - [ ] CS.CM.02: Listened to and summarized key elements of verbal and non-verbal communication
  - [ ] CS.CM.03: Gave and received feedback in a positive manner
  - [ ] CS.CM.04: Read technical/instructional materials for information and applied to tasks
  - [ ] CS.CM.05: Wrote instructions, technical reports, and business communications clearly and accurately
  - [ ] CS.CM.06: Spoke clearly, accurately, and appropriately when giving oral instructions, technical reports and business communications

- [ ] *Teamwork (TW)*
  - [ ] CS.TW.01: Identified teams and roles within teams; described importance of roles
  - [ ] CS.TW.02: Demonstrated skills that improve team effectiveness (e.g., negotiation, compromise, conflict management, shared decision-making)

- [ ] *Employment Foundations (EF)*
  - [ ] CS.EF.01: Applied academic knowledge and technical skills in a career context
  - [ ] CS.EF.02: Selected, applied and maintained tools and technologies appropriate for the workplace
  - [ ] CS.EF.03: Identified parts of organizations and systems and how they fit together
  - [ ] CS.EF.04: Described how work moves through a system
  - [ ] CS.EF.05: Described the changing nature of work, workplaces and work processes on individuals, organizations and systems
  - [ ] CS.EF.06: Demonstrated appropriate dress, appearance and personal hygiene
  - [ ] CS.EF.07: Explained and followed health and safety practices
  - [ ] CS.EF. 08: Explained and followed regulatory requirements, security procedures and ethical practices

- [ ] *Career Development (CD)*
  - [ ] CS.CD.01: Assessed personal characteristics related to educational and career goals
  - [ ] CS.CD.02: Researched and analyzed career and educational information related to project
  - [ ] CS.CD.03: Developed and discussed a plan designed to achieve personal, educational and career goals
  - [ ] CS.CD.04: Monitored and evaluated educational and career goals
  - [ ] CS.CD.05: Demonstrated job-seeking skills (e.g., writing resumes, completing applications and participating in interviews)

CIVIC STANDARDS

- [ ] Understand rights and responsibilities of citizens
- [ ] Understand that limited resources make economic choices necessary
- [ ] Design and implement strategies to analyze issues, explain perspectives and resolve issues
- [ ] Other, please explain _____

CAREER-RELATED LEARNING EXPERIENCE
STUDENT REFLECTION

Name: _____

Project Title: _____

Class: _____ Grade: _____

☐ SERVICE-LEARNING Teacher: _____

☐ OTHER_____

RELEVANCE: How did this experience relate to your personal interests?

RIGOR: What skills and knowledge have you acquired from this experience that will help you achieve your post-high school goals?

REFLECTION: What is something new or surprising that you learned or experienced while participating in this project?

STUDENT SERVICE HOURS LOG

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Jun																																
July																																
Aug																																
Sept																																
Oct																																
Nov																																
Dec																																
Jan																																
Feb																																
Mar																																
Apr																																
May																																

http://www.csd509j.net/district_information/departments_and_services/extended_learning/service_learning_resources.html

Community Sharing

When a student shares a project, they convey their inspiration of the natural world and hearten others to seek similar ventures. Opportunities for sharing student projects should be identified from the onset of participation in HW. By recognizing and rewarding youth engaged in civic activities that benefit their home waters, we seek to encourage their continued involvement and spark the interest of new audiences by showcasing student work.

Suggested products of student work include:

- Photos, drawings, wildlife art
- Maps, charts, graphs
- Power Point Presentations
- Essays, poetry, journal entries
- Oral histories
- WQ data, riparian assessments, bird counts
- Public art, murals
- Ephemeral art, music, skits, plays
- Anything a creative group can imagine!

Created products can be shared through:

1. *healthy waters* Journal, *healthy waters kids* and *HWI* website
2. Local newspaper
3. Watershed council events
4. Watershed symposiums or celebrations
5. Public libraries or other public buildings

Projects can also be shared through student summits or symposiums. These events provide opportunities for students to see what other students have created in their community.

Summits can tie into existing events and take place in an auditorium, theatre, or environmental center. Members from the general public including watershed council boards, community members and parents can be invited to attend and share in the work of their students.

Student summits provide opportunities for students to:

1. Interpret their watershed
2. Celebrate their watershed
3. Present projects to the public and their peers
4. Learn from other students
5. Teach the greater community
6. Develop public speaking skills
7. Integrate their learning into the larger community.

We encourage the sharing of student work through *HWI*! Please submit the Service Learning/ Independent Project Tracking Sheet to *HWI* for publication in our journal or through our website.

Culminating Project

1. This project should be something that is woven into the program and not done at the end. There may be a week to finish up projects after the core curriculum is taught, but the project should be thought about and information gathered, if possible, throughout the unit.

2. The project can be big or small, but chosen in cooperation with the teacher and student.

3. There should be a final product that can be presented at the culminating event and possibly showcased in the community after.

Here are some culminating project topic ideas:

1. Problems facing your watershed
2. Great things happening in your watershed (restoration projects, community action)
3. How the government or politics have affected your watershed historically...presently (policies, laws...).
4. Who takes care of your watershed? What do they do? Where does the money come from?
5. How can you be involved in watershed restoration? What do people do to help or hinder progress?
6. Write a proposal and possibly even implement a restoration project in your area.
7. Future: If things continued as they are today what would become of your watershed?
8. If things continued as they were 30-40 years ago what would your watershed be like today?
9. One specific area of focus on your watershed:
    a. history
    b. plants & other veg.
    c. water quality
    d. animals
    e. insects
    f. source
    g. cleanliness
    h. soil
10. Analysis of local groundwater recharge. What does an aquifer system look like? Is your water table threatened? What influences your city's groundwater recharge? What can be done to ensure continued groundwater recharge?
11. The affect of people on the watershed
    a. urbanization
    b. farms
    c. factories
    d. construction
    e.living everyday
    f. water use/management
12. How do you affect the watershed?

EXAMPLES OF FINAL PROJECTS

- Written report
- Poster board
- Power Point presentation
- Tri-fold presentation board
- Video
- Picture diary/photo journal
- Poetry
- Artwork
- Brochure
- Web Page/site
- Watershed Maps (3-dimensional, GIS, habitat maps, etc.)
- Anything creative the kids can come up with. The possibilities are endless.

Appendix

List of Local Partners and Project Opportunities

The following service-learning project resource lists were compiled to assist teachers and students in designing projects. Schools are encouraged to partner with one or more of these organizations for projects in the local watershed to help with technical and material support. A partner may also be able to enhance the learning component of their projects to meet your needs. It's a good idea to alert your local watershed council coordinator of the project you and your students are planning. To find out which watershed your school belongs or if you have any questions, please contact the *Healthy Waters Insititute* and assistance will be provided.

PORTLAND AREA

Local Watershed Councils

Columbia Slough Watershed Council
Contact: Katie Meckes
volunteer@columbiaslough.org
The Columbia Slough Watershed Coordinator can help organize different projects within the area, including those at Whitaker Ponds. Schools within this area are encouraged to participate in these projects.

Johnson Creek Watershed Council
Contact: Christine Steele
503-652-7477
csteele@jcwc.org
1900 SE Milport Rd., Suite B, Milwaukie, OR 97222
The Johnson Creek Watershed runs from Milwaukie east to Gresham. The council is constantly doing watershed restoration projects. Projects are suitable for middle school and high school students. Call for a list of projects with names of the project coordinators

Tualatin Riverkeepers
Contact: Monica Smiley
503-620-7507
monica@tualatinriverkeepers.org
12360 SW Main St. Suite 100
Tigard 97223
The Tualatin Riverkeepers is the umbrella organization for all "Friends of" groups in the Tualatin River watershed. Projects for schools within this watershed can be found here. River clean-ups can be arranged for your group almost any time of the year. There is also an annual Clean-up Day on Earth Day in April in which everyone can participate.

Tryon Resource Management Partnership
Contact: Liz Callison
503-244-0641
callison@agora.rdrop.com
c/o West Multnomah County Soil & Water Conservation District
2115 SE Morrison St., Portland, OR 97214
Projects including stream bank restoration, water quality monitoring, and plant salvaging can be done in the Tryon Creek Watershed area. Projects are suitable for middle school or high school students.

Area-Wide Resources

Friends of Trees
503-284-TREE
fot@teleport.com
2730 NE Martin Luther King Blvd., Portland, OR 97212
"Seed the Future" campaign goes on annually. Students can participate in tree plantings in many neighborhoods in the greater Portland area. They partner with many different schools, public agencies and non-profit organizations. Call for a schedule of plantings.

Portland Parks and Recreation
Contact: 503-823-5121
Volunteer Services, Portland Parks and Recreation
1120 SW 5th Ave., Room 1302, Portland, OR 97204
Projects are done in wetland areas, parks and neighborhoods. Possible projects in the fall and spring include plantings and clean-ups. These projects can be done by all ages, each project is designed to best suit the students' ages and needs.

The Wetlands Conservancy
Contact: 503-691-1394
9675 SW Tualatin-Sherwood Rd., Portland, OR 97062
Small projects can be designed for each individual group on any one of their wetland preserves (located in Washington, Clackamas, and Multnomah Counties). These might include tree planting and blackberry removal. Call for information on the preserve closest to your school.

Other Resources

Community Energy Project
Contact: 503-284-6827
422 NE Alberta St., Portland, OR 97211
High school projects: Every Saturday they need help weatherizing senior citizens' homes. Weatherizing houses cuts the costs of electric bills which in turn reduces the amount of hydroelectric power needed directly affecting salmon.

Friends of Columbia Gorge
Contact: 503-241-3762
319 SW Washington #301, Portland, OR 97204
During May there is a Trail Restoration Week where students can help restore trails in the Columbia Gorge. Another option is to call Kristin about your individual group and she can find a trail that needs fixing. There is always work to be done!

Friends of Forest Park
Contact: Sandy Diedrich
503-223-2708
117 NW Trinity Place, Portland, OR 97209
Ivy Removal—In Forest Park ivy is a non-native plant species that is taking over areas that used to be inhabited by native plants. Project(s) could be after school or on a Saturday.

Hoyt Arboretum Friends Foundation
Contact: Sue Thomas
503-228-8733
4000 SW Fairview Blvd., Portland, OR 97221
Projects include ivy removal, tree planting, and/or trail work (depending on what is needed at the particular time a group wants to do service).

Jackson Bottom Wetlands
Contact: Pat Willis
503-681-6206
205 SE 3rd St., Hillsboro, OR 97123
Maintenance work on these Wetlands in Hillsboro can be done in the spring. Project(s) could entail dusting trails with wood chips, repairing bird boxes, planting native plants and removal of non-native plants. Tools will be provided as well as some education about the wetlands.

METRO Regional Parks and Greenspaces
Contact: Lupine Jones
503-797-1733
600 NE Grand Ave., Portland, OR 97232
Volunteer opportunities include restoration work at Metro greenspaces, Smith & Bybee Lakes or Oxbow Park. Juniors and seniors in high school can join METRO's Volunteer Naturalist Program and become certified to lead elementary school children on Salmon Field Trips next fall.

The Nature Conservancy

Contact: Volunteer Manager
503-230-1221
821 SE 14th, Portland, OR 97214

Projects at local Nature Conservancy preserves in West Linn, and along the Sandy River. Help with trail maintenance or non-native plant removal. Individual opportunities for older students—Every Wednesday night at the Nature Conservancy office volunteers are needed to do a variety of tasks, including stuffing envelopes, mapping local areas, etc. This is a great way to meet and talk with other people interested in the environment.

Portland Audubon Society

Contact: 503-292-6855
5151 NW Cornell Rd., Portland, OR 97210

One day projects are available for students age 13 and older in the sanctuary within Forest Park. Groups of 8-10 students are needed to help with a wide range of projects (i.e. sanctuary maintenance, pulling ivy, bark dusting, etc.). Supervision will be provided.

Tryon Creek State Park (Friends of)

Contact: Stephanie Wagner
503-636-4398
tryonfrn@teleport.com
11321 SW Terwilliger Blvd., Portland , OR 97219

Tryon Creek State Park is located west of the Willamette River just north of Lake Oswego. Projects would have to be organized by the individual group in partnership with the State Park. Projects include ivy removal, trail maintenance, and stream restoration (in the late spring).

List of Grants

The grant opportunities listed below typically have 2-4 page applications and are not especially competitive. Please use this preliminary list as a reference for future planning if deadlines have passed for this year. All of these opportunities should be renewed for another cycle.

NATIONAL

NEA Foundation for the Improvement of Education Award
Contact: 203-822-7840
Goal: Grants seek to fund participation in high-quality professional development such as summer institutes or action research. Grants also fund lesson study or mentoring experiences to improve teaching, curriculum, or student achievement.
Award: $2000-$5000

National Science Teachers Association NSTA Sylvia Shugrue for Elementary School Teachers
Contact: awards@nsta.org
www.nsta.org/dcat
Goal: For an elementary school teacher who implements an interdisciplinary, inquiry-based lesson plan.
Award: $1000

Office of Education (OED) NOAA Environmental Literacy Grants for Free-Choice Learning
Contact: Sarah Schoedinger
704-370-3528
Sarah.Schoedinger@noaa.gov
www.oesd.noaa.gov/funding_opps.html
Goal: The priority is to create a more environmentally literate citizenry.
Deadline: see website for current deadline

Ecology and Environmental Science Teaching Award NABT and Vernier Software and Technology Foundation Award
Contact: www.nabt.org/sup/education/awards.asp
Goal: Award will be given to a teacher who has demonstrated an innovative approach in the teaching of ecology and environmental science.
Award: $1500

STATEWIDE

Diack Family Oregon Ecology Education Fund
Contact: 503-287-7974
www.diack-ecology.org
Goal: Assists in funding activities in Oregon which take children K-12 into the study of ecology in their fields, forests and waters to see personally what lives there and how it thrives. Funding primarily for long term field ecology studies program development, rather than one-day events. Does not cover substitute teachers or transportation.
Award: up to $1500

Learn & Serve America Youth In Action, Oregon Department of Education
Contact: 503-378-3584 x 369
Goal: This grant is designed specifically to remove barriers for service learning projects directly connected to the school curriculum. Barriers include transportation and plant materials. Projects must be student initiated, planned, and implemented and must provide opportunities to develop leadership and citizenship skills. Grants must be written by students and are reviewed by students. All applications that meet the grant criteria will be funded.
Award: up to $500
Deadline: usually mid-February and mid-March

Meyer Memorial Trust Teacher Initiatives Program
Contact: 503-228-5512
www.mmt.org/~mmt
Goal: Stimulating or facilitating more effective learning.
Award: up to $1500 for individual teachers, $5000 for teams
Deadline: February 1 each year

National Wildlife Federation Wild Seed Fund for Schoolyard Wildlife Habitats
Contact: Beth Stout
503-230-0421
stout@nwf.org
Goal: Creating or enhancing an existing schoolyard habitat
Award: one-time $150 plus $25 Fred Meyer gift certificate

The Oregon Parks Foundation
Contact: 503-297-6043
Goal: Land protection, community outdoor recreation and education programs, administrative expenses, publications, conferences and seminars, emergency funding, recognition and student internship in the context of providing for natural park settings and outdoor recreation and educational opportunities.
Award: $1500–5000

SOLV (Stop Oregon Litter & Vandalism) SOLV CUP projects
Contact: 1-800-322-3326
503-844-9571
Goal: Cleanups, prevention (recycling, signage), restoration (for those in need of social services), plantings, development (trail repair, brush removal)
Award: up to $250 plus free SOLV materials, does not cover transportation

PORTLAND AREA

METRO Waste Reduction Education Program
Contact: 503-797-1521
wred@metro.dst.or.us
Goal: Waste prevention and reduction strategies to increase awareness, create more space for recycling, increase efficiency, and decrease paper costs. Many ideas included. Projects must be within METRO boundary.
Award: $500

METRO Environmental Education & Restoration Grant Program
Contact: Lynn Wilson
503-797-1781
wilsonl@metro.dst.or.us
Goal: Provide funding from the US Fish & Wildlife Service to regional schools and programs with grant projects in environmental education or restoration. Projects must be in METRO area.
Award: range from $250–20,000.
Deadline: early fall—contact for dates.

Metro Nature in the Neighborhoods Grants Program
Contact: Janelle Geddes
503-797-1550
NINrestore@metro.dst.or.us
Goal: To link participants and citizens to their watershed through education and restoration. Projects could include efforts that educate and activate communities in their watershed.
Award: $2500-25,000+

Unified Sewerage Agency Community Best Management Practices Funding Project
Contact: Mark Jockers
503-693-4501
mjockers@usa-cleanwater.org

Goal: Funding for projects that improve water quality, emphasizes water quality as a community resource, and is the result of a partnership. Projects must be within Washington County.
Award: average funding level $500 with a maximum of $5000

Environmental Services City of Portland Clean River Works Community Stewardship Grant Program

Contact: Lynn Vanderkamp
503-823-5625
Goal: To provide direct and long term benefits to community and watershed. Projects must involve citizens in the watershed and other partners. Projects must be within the city of Portland.
Award: up to $5000
Deadline: April 1

Local Resources for Teachers (Curricula and Project Implementation)

Portland Public Schools
www.pps.k12.or.us
Departments - Facilities – Health and Safety – Resource Conservation
This site provides a plethora of information from curriculum to organizations that you can go to for support to how you can transform your school grounds.

Wolf Tree Inc
www.beoutside.org
Find out more about field trips, restoration projects, and education materials.

Environmental Education Association of Oregon
www.eeao.org
Curriculum, field trips, workshops, links to local organizations and other information.

Zenger Farm
www.zengerfarm.org
Check out the hands-on farm education, field trips and long-term projects.

Lower Columbia Estuary Partnership
www.lcrep.org
Educational programs, teacher workshops and field trips based around Columbia River Watershed.

Oregon Trout
www.ortrout.org
Elementary and middle school curriculum, high school restoration project coordination, grants to teachers and students, student college scholarships.

Project WET
linh@ci.hillsboro.or.us
Educational materials to those who attend their workshops.

Oregon Forests Resource Institute
www.oregonforests.org
Field trips, programs, workshops and educational materials

Portland Online
www.portlandonline.com
Access Portland Parks and Recreation as well as Portland Water Bureau and Bureau of Environmental services and find education materials, field trips, workshops and more.

OTHER RESOURCES FOR TEACHERS

Classroom Earth
www.classroomearth.org
Environmental education progras that have been rated by educators.

Earthday Network
www.earthday.net
A free network you can join to help plan earth day activities, lessons, and events. Educational material also available.

Environmental Protection Agency
www.epa.gov/teachers/
Curriculum guides and other related links

Project Learning Tree
www.plt.org
Educational materials to those who attend a workshop.